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The Role and Responsibility of the Environmental, Health & Safety Manager in establishing an organization's commitment towards environmental stewardship and workplace safety [as elements of social responsibility]

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The Role and Responsibility of the Environmental, Health & Safety Manager in establishing an organization's commitment towards environmental stewardship and workplace safety [as elements of social responsibility]

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Abstract

Background: Effective and leading Environmental Health & Safety (EHS) Management is a topic of interest and necessity for many organizations and EHS professionals. The role and responsibility of the EHS Manager in establishing an organization's commitment towards environmental stewardship and workplace safety [as elements of social responsibility] evolves continuously. **Objective:** The purpose of this thesis is to identify the roles and responsibilities of an effective EHS Manager, and those roles and responsibilities that support an organization achieving environmental stewardship and workplace safety. **Method:** Salient elements, actions, and characteristics identified as a role or responsibility of the EHS manager within the initial literature review were researched using a three step approach: attendance and participation at EHS conferences and expositions, review of professional literature, and in-depth analysis of Chief Executive Officer (CEO) full interviews conducted by the National Safety Council (NSC) for their annual article "CEOs who Get It." **Results:** An organization's commitment towards environmental stewardship and workplace safety requires the EHS Manager not only to ensure compliance with laws and regulations, but to provide effective leadership with voluntary EHS management systems and programs. The depth of this voluntary commitment to EHS is based on the organization's top manager/ executive, and the organization's vision and mission. **Significance to EHS Management:** The significance of this topic to EHS management is that it presents fundamental requirements of top line management, industry standards, and best practices not required under current regulation to ensure environmental stewardship and a safe workplace.

Quotes from Literature Reviews

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Safety professionals must be good communicators who understand business. The challenge for safety professionals is to operationalize management roles and competencies into action plans. Members of the safety profession often struggle to clarify the specific roles and behaviors needed to accomplish the goals of reducing injuries in the workplace, as suggested by the author in The Journal of Safety, Health and Environmental Research (Blair 2004, 1).

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Culture is like air. We know it's there, but we can't see it. Still, we are totally dependent on the company's culture. That's why I have spent a considerable amount of my time on people issues, says Ong Poh Kwee, Managing Director, Sembawang Shipyard in Singapore (Høifødt 2012).

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According to Sam Fay, Group Safety & Health Compliance Director with McWane, Inc., work with on-site consultation and participation in the Iowa Voluntary Protection Program (VPP) has resulted in improved workplace safety and health performance and other benefits for the company (Fay, 2011).

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The true challenge is to go beyond the standard regulatory requirements and track the leading indicators that determine the ultimate success of our safety program, states Harold L. Yoh III, Chairman & CEO, Day & Zimmerman (Yoh III 2011).

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Increasing employee perceptions of management's personal concern for employee well-being through a dedication to safety will result in positive outcomes beyond improved safety performance. Organizations with a strong commitment to safety may enjoy not only a reduction in safety-related

events but also increases in desirable employee attitudes and behaviours (Michael, Evans, Jansen, Haight 2005, 177).

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The role of the EHS Manager has evolved over the last two decades. The focus of the EHS Manager is shifting from solely a regulatory compliance role to incorporating a green engineering and pollution prevention approach. It is critical for the EHS Manager to have a strong understanding of Environmental Management Systems, regulatory requirements, and ISO standards, as advised by authors in the Journal of Environmental Sustainability (Williamson, Fister, Ramchandra 2013, 1, 7).

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We have learned the key to Soldier safety is engagement by three crucial groups – leaders, fellow Soldiers and family members – all working together to create a safety culture. On and off the job, leaders can have a great impact on their Soldiers by correcting unsafe behavior and taking a personal interest in each Soldier's life. Fellow Soldiers often are critical in helping their "battle buddies" make the right decisions whether on or off duty. Family members are the final and perhaps most important safety enablers of the three groups, as they have unparalleled leverage and influence over their Soldiers at home, states Brigadier General William T. Wolf (Wolf 2011).

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Implementing a safety management system is the most efficient way of allocating resources for safety, since it not only improves working conditions, but also positively influences employees' attitudes and behaviors with regards to safety, consequently improving the safety climate. The safety climate and the safety management system are considered basic components of the firm's safety culture (Fernández-Muñiz, Montes-Peón, Vázquez-Ordás 2006, 52-53).

Chapter 1.0 Introduction

Topic

The topic of this thesis is to identify and assess the leadership roles and responsibilities of the successful Environmental Health & Safety (EHS) Manager in establishing an organization's commitment towards environmental stewardship and workplace safety. Environmental stewardship and workplace safety are viewed by the researcher as elements of an organization's social responsibility.

The *Guidance on Social* Responsibility of the International Organization for Standardization (ISO) defines *social responsibility* to be

> responsibility of an organization for the impacts of its decisions and activities on society and the environment, through transparent and ethical behavior, that; contributes to sustainable development, including health and the welfare of society; takes into account the expectations of stakeholders; is in compliance with law and consistent with international norms of behavior; and is integrated throughout the organization and practiced in its relationships (ISO 26000 2013).

An organization's commitment to environmental stewardship and workplace safety may be expressed through the various elements identified in the table below, and is discussed in this work with respect to the role of the EHS manager in expressing that commitment.

- EHS policy, mission, vision, and directives
- EHS programs standardized by
- Management commitment
- Voluntary programs, best

organizations/ industry

- Policies, programs, procedures required by the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and/ or State or Local Agencies

practices

- Integration of EHS into the organization
- EHS Leadership
- Management Systems

The objective of this thesis is to:

1. Identify the roles and responsibilities of an EHS Manager that best supports an organization achieving environmental stewardship and workplace safety.

Thesis Focus

This thesis begins by identifying EHS requirements, recommendations, and best practices that demonstrate a commitment to environmental stewardship and workplace safety. It then identifies the role of the effective EHS manager with respect to each. While this research focused primarily on the EHS Manager's role and responsibility in the context of health and safety management, it became evident that commitment to workplace safety has direct impacts on environmental stewardship and those relationships are included in the discussion.

Significance to EHS Management

The significance of this topic to EHS management is to identify voluntary and best practices to ensure environmental stewardship and a safe workplace, where the EHS Manager can be a value added facilitator of EHS to the organization. The commitment to implement and establish EHS management, voluntary and best practices, is provided by top line management. Accountability and control of EHS within organizations resides with top line management, therefore commitment to EHS is provided from the highest management/ executive level.

Reason for Interest

As an Occupational Health & Safety Manager, my interest in this thesis is strong, professional, and personal. I am seeking to define and describe the elements, actions, and characteristics of an excellent EHS manager and leader. Continuous improvement and zero defects are terms used throughout many aspects of business such as quality, production/ operations, maintenance, and EHS. To achieve zero defects in each of these aspects of business, regulatory and voluntary programs must be implemented, and managed actively. Top management commitment, and effective leadership, is required in one's organization to achieve 100% compliance, and for the implementation of value added voluntary programs. The thesis in turn provides the fundamentals of leadership, and makes a significant contribution towards the foundation needed for an EHS professional and the EHS program. This is important because as one's career progresses in the form of management, the opportunity to be a leader or champion in one's career increases. The opportunity to become a value added employee to the organization and to the employees of the organization increases.

Research Question

What are the roles and responsibilities of an effective EHS Manager in leading the organization towards excellence and continuous improvement in environmental stewardship and workplace safety?

Terminology

(1) Cost-benefit analysis - A method of measuring the benefits expected from a SH&E decision, calculating the cost of the decision, and determining if benefits outweigh the actual costs (Veltri and Ramsey 2009, 24).

(2) Culture - unwritten assumptions that influence decision making, attitudes and beliefs, and guides the behavior of those in the culture (Krause 2009, 4).

(3) Economic analysis - A technique for comparing two or more mutually exclusive alternatives under given assumptions and constraints. Account for the opportunity costs or resources employed and attempts to measure in monetary terms the private and societal costs and benefits of a project (Veltri and Ramsey 2009, 24).

(4) Effective management – In 1989, Occupational Health & Safety Administration issued recommended guidelines for effective management and protection of worker safety & health. An effective occupational safety and health program will include the following four main elements: management commitment and employee involvement, worksite analysis, hazard prevention and control, and safety and health training (1926 Subpart C, Safety and Health Program Management Guidelines, 2014).

(5) Effective program – includes provisions for systemic identification, evaluation and prevention or control of hazards. Goes beyond specific requirements of the law to address all hazards (Occupational Safety & Health Administration, Elements of an Effective Safety & Health Program, Slide 4, 2014).

(6) Environmental Management System – a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency (Environmental Protection Agency, Environmental Management System, 2014).

(7) Environmental stewardship - the responsibility for environmental quality shared by all those whose actions affect the environment (Environmental Protection Agency, Environmental Stewardship, 2014).

(8) IOS [ISO] – The International Organization for Standardization, located in Geneva, Switzerland, promotes the development and implementation of voluntary international standards, both for particular products and for environmental management (EPA, 2014).

(9) Leading indicator - proactive, preventative, and predictive measures that monitor and provide current information about the effective performance, activities, and processes of an EHS management system that drive the identification and elimination or control of risks in the workplace that can cause incidents and injuries (Sinelnikov, Inouye, Kerper 2013, 2).

(10) OSHA Voluntary Protection Program (VPP) – The legislative authority for VPP is Section (2)(b)(1) of the Occupational Safety and Health Act of 1970, which declares Congress's intent "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources - by encouraging employers and employees in their efforts to reduce the number of occupational safety and health hazards at their places of employment, and to stimulate employers and employees to institute new and to perfect existing programs for providing safe and healthful working conditions (OSHA, Voluntary Protection Programs, 2014)

(11) Social Responsibility – responsibility of an organization for the impacts of its decisions and activities on society and the environment, through transparent and ethical behavior, that; contributes to sustainable development, including health and the welfare of society; takes into account the expectations of stakeholders; is in compliance with law and consistent with international norms of behavior; and is integrated throughout the organization and practiced in its relationships (ISO 26000 2013).

(12) Top Management Commitment - Direct participation by the highest level executives in a specific and critically important aspect or program of an organization. In quality management it includes (1) setting up and serving on a quality committee, (2) formulating and establishing quality policies and objectives, (3) providing resources and training, (4) overseeing implementation at all levels of the organization, and (5) evaluating and revising the policy in light of results achieved (Top Management Commitment, 2014).

(13) Transformational Leadership – conveys a sense of trust and meaningfulness and individually challenges and develops employees (Walter 2013).

(14) Workplace Safety - refers to the working environment at a company and encompasses all factors that impact the safety, health, and well-being of employees. This can include environmental hazards, unsafe working conditions or processes, drug and alcohol abuse, and workplace violence. Workplace safety is monitored at the national level by the Occupational Safety and Health Administration (OSHA) (Workplace Safety, 2014).

(15) Zero Injury, Zero Defects – a zero-injury safety culture, a workplace that neither tolerates, nor experiences, injuries (Williamsen 2005, 9). If you can measure how many

“defects” you have in a process, you can systematically figure out how to eliminate them and get as close to “zero defects” as possible (General Electric, What is Six Sigma 2013).

Chapter 2.0 Background

This thesis topic, focus, and reason for interest is, in part, due to two organizations receiving much attention for their lack of commitment and effectiveness with EHS.

The organizations presented are British Petroleum (BP), and McWane Incorporated.

Leadership, EHS management and culture, within these organizations drew much attention and review in recent years, 2003 to 2008.

British Petroleum (BP) Case Study

Leadership at British Petroleum (BP) was "slammed for poor leadership on safety," in 2005 through 2006 when BP's Texas City, Texas, refinery killed 15 workers and injured more than 180 as a result of an explosion and fire (Hofmann, 2007). The Baker panel, a safety review panel, released a report that "suggested major weaknesses," and identified deviations from company procedure, a limited use of leading indicators, and a lack of leadership and accountability. Interviews by the Baker Panel, of the Texas City workforce, principally hourly workers, determined that workers did not follow policies or procedures. Workers pointed to a number of reasons for this, including: a lack of training regarding policies and procedures, a lack of knowledge regarding where to locate policies, and insufficient time to follow procedures. Hourly workers explained that prior to March 2005, "policies were not enforced strictly and few consequences existed if an employee did not follow a policy" (Baker, III, Leveson, Bowman, Priest, Erwin, Rosenthal, Gorton, Tebo, Hendershot, Wiegmann, Wilson 2007, 144). Additionally, the Chemical Safety and Hazard Investigation Board also known as the Chemical Safety Board (CSB), provided a report on the explosion, incidents leading up to the explosion and fire, and a list of deviations from procedure by management. The final report identified and

investigated the following key issues: safety culture, regulatory oversight, process safety metrics, and human factors (Chemical Safety Board 2007).

The Chemical Safety Board (CSB) provided a 55 minute video in 2008 entitled "Anatomy of a Disaster" that further describes and illustrates the above listed deviations and non conformances (Anatomy of a Disaster, CSB 2008).

McWane Incorporated Case Study

"Its iron foundries thrive. But the McWane corporation's way of doing business has left a shocking trail of death, dismemberment and pollution," as stated by the Public Broadcasting Service (PBS) (PBS 2013). McWane Inc., a manufacturer of fire hydrants, iron pipe and valves, for water infrastructure, is described by the New York Times as being cited for "more than 400 safety violations since 1995, a period during which 4,600 workers were injured and 9 were killed; 3 of those deaths were caused by deliberate violations of federal safety standards. An inept response by regulators failed to halt the infractions" (New York Times, Cracking Down on Rogue Employers, 2003).

> It is said that only the desperate seek work at Tyler Pipe, a sprawling, rusting pipe foundry. Behind a high metal fence lies a workplace that is part Dickens and part Darwin, a dim, dirty, hellishly hot place where men are regularly disfigured by amputations and burns, where turnover is so high that convicts are recruited from local prisons, where some workers urinate in their pants because their bosses refuse to let them step away from the manufacture... (Barstow and Bergman, At a Texas Foundry, 2003)

New York Times authors David Barstow and Lowell Bergman further describe that at Atlantic States Cast Iron Pipe, the McWane plant in Phillipsburg, N.J., “residents have complained about pollution for decades. Local newspapers reported that crossing guards near the plant once had to wear gas masks” (Barstow and Bergman, A Family’s Fortune, 2003).

Articles in the series, “Dangerous Business”, were published in The New York Times. “Dangerous Business” was a joint effort by The New York Times, "Frontline" and the Canadian Broadcasting Corporation (Barstow and Bergman 2013).

Appendix A provides a list of the New York Times articles in this series, and links to two PBS Specials that provide an in depth video of McWane in 2003, and as revisited in 2008. The titles and dates of these articles, in Appendix A, provide a timeline in how quickly media, enforcement and legal actions, against the organization and management were taken. The in depth videos by PBS provide an invaluable documentary from the perspective of employees, regulatory agencies, and the McWane organization.

Chapter 3.0 Literature Review

Literature searches and review initially focused on leadership and management roles, and responsibilities within EHS Management. The articles included several areas of traditional and transformational leadership, traditional and non-traditional practices, and management commitment to EHS management that provided background literature, current issues and trends. The literature review provided a foundation of new knowledge, with some expected and with many unexpected results. The literature review sections below focus on the current and evolving role of the EHS Manager, as compared to the traditional role.

Data collected from a review of the literature are included in following eight categorized sections:

1. Evolving Role of EHS Manager
2. Business Case for EHS
3. Management Practices for Safety Leaders
4. Success Factors Influencing EHS Programs
5. Management Commitment and Employee Involvement
6. Voluntary Protection Programs
7. EHS Management Systems
8. Transformational Leadership

1. Evolving Role of EHS Manager

New York State Pollution Prevention Institute (NYSP2I) staff Dr. Anahita Williamson, David Fisher, and Rajiv Ramchandra, indicate "the focus of the EHS Manager is shifting from solely a regulatory compliance and waste treatment or waste disposal role to incorporating green engineering and pollution prevention approach when solving environmental problems" (Williamson, Fisher, Ramchandra 2013, 1). The authors provide three areas where the EHS Manager must "have a strong understanding;" (1) Environmental Management Systems (EMS), (2) regulatory requirements, and (3) ISO standards pertaining to environmental, health and safety.

The authors explain "NYSP2I has found the following nine steps to be effective when implementing pollution prevention solutions, particularly when the EHS Manager is taking the lead and working with manufacturing personnel" (Williamson, Fisher, Ramchandra 2013, 14-15).

These nine steps, described by the authors, are:

Step 1. Build strong working relations with manufacturing or operations, a collaborative vs. regulatory approach

Step 2. Educate key personnel on benefits of pollution prevention and sustainability initiatives—through training programs or attending conferences

Step 3. Focus on the direct impact to the bottom line to obtain buy-in from both management and manufacturing personnel

Step 4. Develop the baseline; quantify the current state of the process (often entails material and energy input-output analysis)

Step 5. Identify opportunities for environmental improvements and cost reduction

Step 6. Prioritize opportunities

Step 7. Obtain buy-in from upper management on the top opportunities

Step 8. Seek out experts (consultants, universities, P2 organizations) to aid with prioritization, assessments, and implementations

Step 9. Seek out funding opportunities (state, federal, other stakeholder organizations) to offset the cost of implementing sustainable practices/technologies

The authors describe that these steps were developed through "a history of successful and unsuccessful projects with New York State companies. Successful implementation of pollution prevention recommendations typically had most of these steps in place," and many case studies are provided in the literature (Williamson, Fisher, Ramchandra 2013, 6-14). "Unsuccessful or stalled implementation of projects typically had multiple missing or incomplete steps," as explained by the authors. "In order for EHS Managers to successfully integrate themselves on a manufacturing team and make their projects a priority, they must clearly identify the business case and potential cost savings for the project they are promoting" (Williamson, Fisher, Ramchandra 2013, 15).

The authors conclude, that the "evolving and emerging role of the EHS Manager needs to incorporate a balance of traditional functions, pollution prevention & sustainability, and systems thinking." The authors provide an illustration of this evolving role:

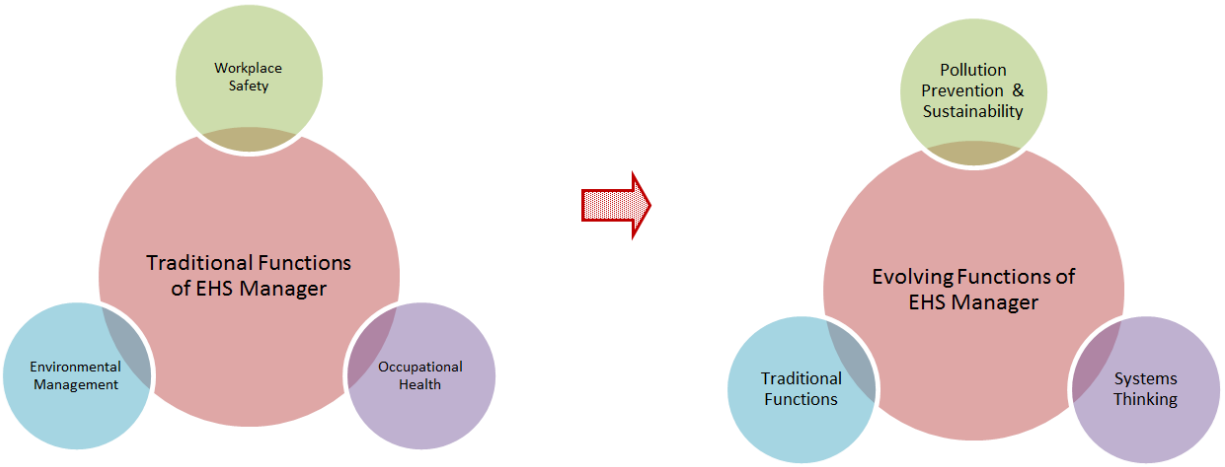

Figure 1. *Evolving Role of EHS Manager in Industrial Sustainability Programs* (Williamson, Fisher, Ramchandra 2013, 15).

2. Business Case for EH&S

Jan-Olaf Williams, Senior Vice President of Storebrand, in his forward to *The Green Bottom Line*, by Martin Bennett and Peter James, states "MONEY is the language of business." The World Business Council for Sustainable Development has recognized that financial terms are a "vital element in motivating business to take action" (Bennett, James 2000, 9). Williams also states that environment-related management accounting is "therefore an essential tool for tomorrow's business."

William R. Blackburn, Vice President, Environment, Health and Safety of Baxter International found an Environmental Financial Statement (EFS) essential to demonstrate that, "contrary to the preconception of many, environment need not be only a burden on business performance but could make a positive contribution. This meant that the EFS could provide a focus within the corporation that would attract attention to the environmental programme, stimulate discussion in internal meetings and encourage motivation" (Bennett and James 2000, 295, 309). Blackburn explained that his organization's environmental balance sheet enabled environmental and business professionals to focus on common opportunities using a common language, the language of business: money (Bennett, James 2000, 309).

Authors Bennett and James conclude, "a successful environmental management system should have a method for accounting for full environmental costs and should integrate private

environmental costs into capital budgeting, cost allocation, process/product design and other forward-looking decisions" (Bennett, James 2000, 85).

According to Earl Blair (2004), author of *Critical Competencies for SH&E Managers – Implications for Educators*, "safety managers may be able to overcome a lack of management commitment and support" by presenting a cost/benefit analysis to management. Blair notes the safety professional who cannot do so could eventually lose his/her position as a result of being considered irrelevant to the operation (Blair 2004, 6).

The Sustainability Handbook, The Complete Management Guide to Achieving Social, Economic and Environmental Responsibility, by William R. Blackburn, provides a business-case argument to support "The Show-Me-the-Money Model" (Blackburn 2007). According to Blackburn, a factor of the Model is the Cost of Capital (Lender and Investor Appeal), and he provides this Business-case argument.

> A significant and growing number of investors and lenders are making investment and lending decisions based not only on traditional financial analysis, but on an evaluation of company social and environmental performance as well. In order to remain attractive to these money providers and keep the cost of capital low, companies should properly manage their sustainability risks (Blackburn 2007).

Blackburn notes the Socially Responsible Investing (SRI) movement or growth, grew "40% faster than all professionally managed United States investments from 1995 to 2005, from $640 billion to $2,290 billion". He further notes that as of 2005, SRI represented $1 of every $10 managed portfolio investments in the United States (Blackburn 2007).

According to Anthony Veltri and Jim Ramsay, in the Professional Safety Journal of the American Society of Safety Engineers, work entitled “Economic Analysis, Make the business case for SH&E” states that “during the past 20 years, the need to make a business case for confronting and managing SH&E issues and practices has grown” (2009). SH&E tends to tie its outcomes to the overall culture of the organization (e.g., management commitment to programs and practices), but not the business outcomes. The authors believe that to make a business case, “SH&E should be structured as an enabler of operational and business performance, and making the business case for SH&E means understanding how SH&E management affects operational and economic outcomes” (Veltri and Ramsay 2009).

The authors provide a six step economic analysis that adopts the perspective of a business manager. The steps illustrate how one might determine a cost-benefit ratio for a 1-year Hazard Communication intervention program. The six steps are: (1) Initial Assessment, (2) Monetize the Exposures, (3) Establish the Present Value of Program Costs, (4) Evaluation, (5) Establishing Present Value of Program Benefits, and (6) Cost-Benefit Ratio Calculation. As a “disclaimer,” by the author, this is an outline and is not an exhaustive example of how to identify and monetize all possible benefits and costs.

Veltri and Ramsay 2009 conclude, “economic analysis in SH&E management is used when economic considerations dominate and drive the firm’s operational decision-making.” Cost and profitability potential are the criterion for choosing among which SH&E issues and opportunites to manage, and which alternative solutions to make investments (Veltri and Ramsay 2009).

The work by Anne VanderMey (2009) describes Master of Business Administration students (MBAs) to the Environmental and Financial Rescue, an Environmental Defense Fund program

that gives MBA students a crash course in energy efficiency. MBAs calculate the cost-benefit to show the payoff to the company's bottom line. VanderMey states, "at first glance, MBAs may seem like an unlikely choice to advise large companies on how to make their businesses more environmentally friendly." MBAs were hired "so that they could make the financial case for energy efficiency," says Millie Baird, project manager of the Climate Corps program. The approach to hire MBAs was "born out of frustration that most companies don't give much of a hearing to environmental issues, which are traditionally associated with economic sacrifice" (Vandermey 2009).

The business case for EHS, provides or can gain new benefits for the EHS professional and the organization through systematically understanding the total financial costs and benefits of environmental health and safety actions.

3. Management Practices for Safety Leaders

According to Guy Boyd, BST Solutions contributor, safety leaders can be described in seven behavioral terms, "these behaviours have been shown to correlate positively with culture and climate attributes that support good safety outcomes" (Boyd 2013). The author Boyd details the seven behaviours as:

> Vision - The effective leader is able to "see" what safety excellence would look like and conveys that vision throughout the organization. This leader acts in a way that communicates high personal standards in safety, helps others question and rethink their assumptions about safety, and describes a compelling picture of what the future can be.

Credibility - The effective leader fosters a high level of trust in peers and reports. This leader is willing to admit mistakes with others, advocate for direct reports and the interests of the group, and giving honest information about safety.

Collaboration - The effective leader works well with other people, promotes cooperation and collaboration in safety, actively seeks input from people, and encourages others to implement their decisions and solutions for improving safety.

Communication - The effective leader is a great communicator. He or she encourages people to give honest and complete information about safety even if the information is unfavorable.

Action-Orientation - The effective leader is proactive rather than reactive in addressing safety issues. This leader gives timely, considered responses for safety concerns, demonstrates a sense of personal urgency and energy to achieve safety results, and demonstrates a performance-driven focus by delivering results with speed and excellence.

Feedback & Recognition - The effective leader is good at providing feedback and recognizing people for their accomplishments. This person publicly recognizes the contributions of others; uses praise more often than criticism, gives positive feedback and recognition, and finds ways to celebrate accomplishments in safety.

Accountability - Finally, the effective leader practices accountability. He or she, clearly communicates people's roles in the safety effort, and fosters the sense that every person is responsible for the level of safety in their organisational unit. The author

> states that it is important to note that this practice is placed last; accountability, absent the context of the other practices, can be counterproductive. Employees will know they will be held accountable, but not necessarily given the resources, information, leadership, support, and encouragement they need to accomplish the task. When used as part of the other six practices, however, accountability complements the work begun.

The author Boyd concludes “the secret of great safety leadership is that it is no different from great leadership generally; it requires great leaders who are motivated to improve safety. Regardless of where a leader is, safety leadership behaviours can be learned and developed.” Boyd explains “like all new behaviours, these take practice, self knowledge, and an attention to the qualities and abilities of the individual leader. Done well, leadership development supports a comprehensive approach to safety improvement, and positions leaders at any level to make a difference in the lives and livelihoods of their coworkers” (Boyd 2013).

According to Alison G. Vredenburgh, PhD in Industrial–Organizational Psychology and MS in Systems Management, her study systematically examined the degree to which six specific management practices were frequently included in safety programs that contributed to a safe work environment for hospital employees. These practices are; management commitment, rewards, communication and feedback, selection, training, and participation. The author determined, “the most effective step that hospitals can take is in the front-end hiring and training of new personnel.” Additionally, the author adds that hospitals “should also ensure that the risk management position has a management-level classification” (Vredenburgh 2002 259, 273).

4. Success factors influencing EHS programs

Authors Aksorn and Hadikusumo, PhDs in Construction, Engineering and Infrastructure Management at the Asian Institute of Technology, Thailand, identified and ranked 16 Critical Success Factors (CSFs) of safety program implementation based on their degree of influence. Their study revealed ‘‘management support was the most influential factor for safety program implementation” in the Thai construction industry (Aksorn, Hadikusumo 2007). The authors results of the 16 CSFs, in order of the degree of influence, were: (1) management support, (2) appropriate safety education and training, (3) teamwork, (4) clear and realistic goals, (5) effective enforcement scheme, (6) personal attitude, (7) program evaluation, (8) personal motivation, (9) delegation of authority and responsibility, (10) appropriate supervision, (11) safety equipment acquisition and maintenance, (12) positive group norms, (13) sufficient resource allocation, (14) continuing participation of employees, (15) good communication, and (16) personal competency.

Additionally, the Aksorn and Hadikusumo (2007) used a Factor Analysis technique, that identified CSFs were grouped into four major dimensions namely; (1) worker involvement, (2) safety prevention and control system, (3) safety arrangement, and (4) management commitment. The authors provided further detail for each category.

> ‘‘Worker involvement’’ referred to creating favourable safety attitudes and motivation of workers which largely depended on constructive norms of the workgroup and their degree of their participation in safety activities.
>
> ‘‘Safety prevention and control system’’ required an effective enforcement scheme, appropriate supervision, equipment acquisition and maintenance, appropriate safety

education and training, program evaluation and staffing qualified persons in order to successfully implement a safety program.

''Safety arrangement'' involved setting up proper mechanisms to disseminate information to all people concerned, assigning clear authorities and responsibilities to everyone at all levels as well as allocating adequate resources to safely carry out activities.

''Management commitment'' consolidated the safety program implementation through visible support of the top management which also included encouraging all employees to achieve success through team-spirit and setting realistic and achievable safety goals which could be accomplished.

The authors conducted three case studies, "to ensure the contribution of the CSFs to the safety standards were realistic." The results supported that where all CSFs, and not just one or a few, are given proper commitment; there is improved safety performance.

In 1999, Behavioral Science Technology, Inc. (BST) identified nine culture and leadership practices through experience with clients that independently correlates and quantifies safety performance. This work formed the Organizational Culture Diagnostic Instrument (OCDI). As Tom Krause (2009) explains the OCDI, "interestingly, only three of the six dimensions are safety specific."

The nine scales the OCDI records perceptions on are: Leader-Member Exchange, Procedural Justice, Management Credibility, Perceived Organizational Support, Teamwork, Workgroup Relations, Organizational Value for Safety, Upward Communication on Safety Issues,

Approaching Others on Safety Issues (Predictive Measurement to Optimize Success, BST Solutions 2014).

In a proprietary study published in 2006, BST found that higher culture (OCDI) scores correlated to lower occupational injury rates (Krause 2009). The study looked at 94 organizations, representing eight countries and 18 industries that had used the OCDI. The top third of the organizations that scored consistently high across all OCDI scales averaged an occupational injury rate of 4.3 injuries per 100 employees per year, while bottom third averaged 8.5. Organizations in the middle third averaged 5.8 occupational injuries per 100 employees per year. The difference between the three groups was identified by BST as statistically significant: (df (94), -.331, p<.01).

5. Management Commitment and Employee Involvement

Authors Michael, Evans, Jansen, and Haight 2005, from the article *Management commitment to safety as organizational support: Relationships with non-safety outcomes in wood manufacturing employees,* indicate that "increasing employee perceptions of management's personal concern for employee well-being through a dedication to safety will result in positive outcomes beyond improved safety performance." A total of 641 hourly production employees, at three unionized wood products manufacturing facilities, owned by a large wood products manufacturer, completed a survey. The survey measured management commitment to safety, job satisfaction, affective commitment to the organization, perceived dangerousness of their position, and withdrawal behaviors. Supervisors were asked to rate each of their hourly subordinates. The authors provide that management involvement and commitment can be

accomplished in a variety of ways, including; (1) showing personal concern of for the health and safety of employees, (2) implementing job-training program, (3) participating in the management of safety committees, (4) considering safety in job design, and (4) reviewing the pace of work. The authors' results suggest that "employee outcomes differ based on perceptions of management's commitment to safety. Specifically, management commitment to safety was positively related to job satisfaction, organizational commitment, and job-related performance (Michael, Evans, Jansen, and Haight 2005, 177)." Additionally, a negative relationship between commitment to safety and employee withdrawal behaviors was found by the authors.

Authors Abudayyeh, Fredericks, Butt, and Sharr 2005, from the article *An investigation of management's commitment to construction safety,* provide results that "point to a clear statistical correlation between management commitment safety and injury and illness rates." A survey was developed, and sent to the top five hundred United States construction companies, 40 completed surveys were returned. The survey measured; company profile, company priorities, safety program issues, and safety management. The authors conclude that

> safety managers and teams can improve their programs by focusing more on engineering improvements to equipment, methods, and materials while changing human behavior positively through education and training. Safety should not only be viewed as OSHA regulations that need to be adhered to, but must also become a value and a culture with clear commitment from all levels of management (Abudayyeh, Fredericks, Butt, and Sharr 2005).

The authors conclude “a clear commitment from management to construction safety can be materialized and demonstrated” by having seven elements. These seven elements are described by the Abudayyeh, Fredericks, Butt, and Sharr 2005 as:

1. Safety budget (>$1000, for unquestioned, immediately requested items): An essential factor that must not be compromised, and a clear element that helps management enhance safety.
2. Safety management position (on-site): The safety manager or director must have the knowledge, skills, and ability to build a successful team that is safety conscious.
3. Communication skills: It is essential for the safety manager to make safety second nature for the whole team. Improving the sense of safety requires behavioral changes that can only be achieved through continuous education and training followed by feedback and evaluating results.
4. Safety culture: Safety culture on a project is evident when safety is on the mind of all personnel from the worker to the supervisor to middle and upper management levels. Education and training must target all personnel involved in a project and focus on the value of safe practices rather than penalties if safety rules are not followed.
5. Empowerment: When people feel empowered, safety becomes their own personal goal and responsibility. The sense of safe behavior spreads to other situations and behaviors that give a feeling of control over changing unsafe practices.

6. Continuous monitoring and improvement: Monitoring the performance of the workers and using reliable feedback give safety managers a tool to improve their safety programs and techniques.
7. Involvement: Workers and employees that participate in policy making are more motivated to carry that policy and improve on it through personal responsibility and continuous feedback (Abudayyeh, Fredericks, Butt, and Sharr 2005).

The authors, additionally conclude, "the presence of the above mentioned elements, as part of a comprehensive safety program, might significantly contribute to the improvement of a company's safety record." However, the authors explain, "more research is needed to determine the impact of safety culture, empowerment, monitoring and improvement mechanisms, and employee involvement on incident rates. It is with this knowledge that a solid foundation for a safe working environment can be built" (Abudayyeh, Fredericks, Butt, and Sharr 2005).

Authors on safety leadership and culture, James Roughton and James Mercurio, present the question "Does Management Commitment Make a Difference?" They explain that most managers can give many good reasons to improving, developing, and managing their safety program, but cannot tell you how to develop and enhance their safety management systems. The authors explain that they see a "problem" with managers only seeing injury costs that are on the surface, and not always understanding the hidden cost.

The authors conclude with: to reduce risks effectively, safety must be addressed as would production, quality control and/ or costs. Safety management systems must be consistent with other program requirements. A balanced program attempts to optimize safety, performance,

and cost. A “visible” safety program helps to set the stage for improved employee attitude. Periodic safety related training and inspections by top management helps to convince employees that the program is not merely administrative. To help understand the impact of cost, five case studies are presented in detail in the next section, 6. Voluntary Protection Programs).

The Occupational Health and Safety Administration (OSHA) describes management commitment and employee involvement as (1) management leadership and employee involvement are complementary. (2) Management leadership provides the motivating force and the resources for organizing and controlling activities within the organization. (3) In an effective program, management regards worker safety and health as a fundamental value. (4) Employer involvement provides the means through which workers express their own commitment to safety and health, for themselves and their fellow workers. (5) Within management commitment and employee involvement are four main topics; (i) management leadership, (ii) employee involvement, (iii) responsibility, authority and accountability, (iv) review of program operations (OSHA 2013).

6. Voluntary Protection Programs

According to Dr. John Morelli, author of *Voluntary Environmental Management, The Inevitable Truth,* the “EPA has recognized the trend towards and acknowledged the benefits of voluntary private-sector environmental performance” (Morelli 1999, 3). “To encourage companies to conduct voluntary, comprehensive environmental compliance activities,” the U.S. EPA has instituted a variety of partnerships and programs within the Office of Pollution Prevention and

Toxics (Morelli 1999, 65). These include and are described by the EPA (Partnerships and Programs, 2014) as;

Regulatory Programs - This list includes activities that are controlled by law and generally with which individuals, facilities or companies must comply.

Partnership Programs - This list includes activities for which EPA collaborates with businesses, facilities, and other organizations to achieve measurable results in pollution prevention and chemical risk reduction.

Programs for Private Companies and other Stakeholders - This list of regulatory and partnership programs includes activities that encourage small businesses and other private companies to participate and in general reduce pollution.

Intergovernmental and International Programs as well as Programs for Schools and Private Companies - This list of regulatory and partnership programs includes activities that are relevant to government entities, schools, and businesses.

Programs for Communities and Citizens, as well as Private Companies – The list includes activities that encourage citizens and private companies to improve the environmental quality of their communities.

Authors Roughton and Mercurio 2007 presented the question "Does Management Commitment Make a Difference," and provide the following OSHA Voluntary Protection Program (VPP) case histories to help understand the impact of cost:

Case 1: a major chemical company brought all plants into the VPP process. Injuries decreased and worker's compensation costs decreased by $1.6 million. This reduction

occurred in the years the company was qualifying its plants for VPP. Additional savings came from reductions in third-party lawsuits from contractor employees.

Case 2: a major utility company brought two large power plant construction sites into VPP. Direct cost savings from preventing incidents were $4.14 million at one site and $.5 million at the other.

Case 3: a rail car manufacturer began preparing for VPP, within two years workday case incident rate decreased from 17.9 to 5.9.

Case 4: a resident contractor at a petrochemical plant made the commitment to VPP participation, and was approved three years later. Worker's compensation costs dropped from $245,543 to $93,166 over these three years.

Case 5: an agricultural implement manufacturer saw worker's compensation costs decrease and productivity increase while participating in VPP. One plant manager testified that the adoption of a single safe work practice increased volume of a product and savings to $265,000 per year.

More workplace success case histories are described by OSHA by the Voluntary Protection Program Participants Association (VPPPA).

Author Sandy Smith 2005, states "the companies that participate in OSHA's Voluntary Protection Programs have some of the best occupational and health programs in the country." Pete Correll, Georgia-Pacific Corp. chairman and CEO, noted "Safety leadership and employee-driven safety programs – are the cornerstone of VPP," during a ceremony in 2004 honoring the company's acceptance into VPP. The largest participant in VPP with 14,000 employees is the

Norfolk Naval Shipyard, and the smallest participant in VPP has six (Smith 2005). The author also describes how "employees have a starring role," and employees championing the VPP process are common at VPP Star sites.

OSHA provides the "Elements of an Effective Safety and Health Program" in the Training and Reference Materials Library. 20 slides in PowerPoint present the 1989 Voluntary Safety and Health Program Management Guidelines. Major elements of an effective occupational safety and health program include four elements: (1) management commitment and employee involvement, (2) worksite analysis, (3) hazard prevention and control, (4) safety and health training. The PowerPoint includes "Recommended Actions" for each element (Occupational Health & Safety Administration 2014).

7. EHS Management Systems

Authors Fernández-Muñiz, Montes-Peón, Vázquez-Ordás 2006, recognized that implementing a safety management system is "the most efficient way of allocating resources for safety." The authors sampled 455 Spanish companies, measured safety climate, and developed a measurement scale "operationalising the safety management concept, and calculating its reliability and validity." The authors conclude their Safety Management System Scale applied with studies of the safety climate "will permit a greater understanding of the safety culture in organizations advancing in the operationalisation of the safety culture concept" (Fernández-Muñiz, Montes-Peón, Vázquez-Ordás 52, 65 2006).

The United States Environmental Protection Agency (EPA) describes an Environmental Management System (EMS), and provides the basic elements, costs and benefits. The EPA states "the most commonly used framework for an EMS is the one developed by the

International Organization for Standardization (ISO) for the ISO 14001 standard. Established in 1996, this framework is the official international standard for an EMS" (Environmental Protection Agency, Environmental Management System, 2014).

As described by the EPA, an Environmental Management System is "a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency." It helps a company achieve its environmental goals and environmental performance. An EMS helps a company address its regulatory demands in a systematic and cost-effective manner. It is a proactive approach that can help reduce the risk of non-compliance, and improve health and safety practices for employees and the public. The EPA further explains, an EMS can also help address non-regulated issues, such as energy conservation, and can promote stronger operation control and employee stewardship.

Basic Elements of an EMS are:

- Reviewing the company's environmental goals
- Analyzing its environmental impacts and legal requirements
- Setting environmental objectives and targets to reduce environmental impacts and comply with legal requirements
- Establishing programs to meet these objectives and targets
- Monitoring and measuring progress in achieving the objectives
- Ensuring employees' environmental awareness and competence
- Reviewing progress of the EMS and making improvements

Costs and Benefits of an EMS are:

Potential Costs	**Potential Benefits**

Internal • Staff (manager) time • Other employee time (Note: Internal labor costs represent the bulk of the EMS resources expended by most organizations) **External** • Potential consulting assistance • Outside training of personnel	• Improved environmental performance • Enhanced compliance • Pollution prevention • Resource conservation • New customers/markets • Increased efficiency/reduced costs • Enhanced employee morale • Enhanced image with public, regulators, lenders, investors • Employee awareness of environmental issues and responsibilities

Figure 2. Costs and Benefits of an EMS (Environmental Protection Agency, Environmental Management System, 2014)

EMS under ISO 14001 is described by the EPA as "encouraging a company to continuously improve its environmental performance. The system follows a repeating cycle of Plan, Do, Check, Act:

Figure 3. Repeating Cycle (Environmental Protection Agency, Environmental Management System, 2014)

These four steps of the repeating cycle are described as:

Plan - The company first commits to an environmental policy, then uses its policy as a basis for establishing a plan, which sets objectives and targets for improving environmental performance.

Do - The next step is implementation.

Check - After that, the company evaluates its environmental performance to see whether the objectives and targets are being met. If targets are not being met, corrective action is taken. The results of this evaluation are then reviewed by top management to see if the EMS is working.

Act - Management revisits the environmental policy and sets new targets in a revised plan. The company then implements the revised plan. The cycle repeats, and continuous improvement occurs.

The EPA provides the five main stages of an EMS and an image, as defined by the ISO 14001 standard (Environmental Protection Agency, Environmental Management System, 2014).

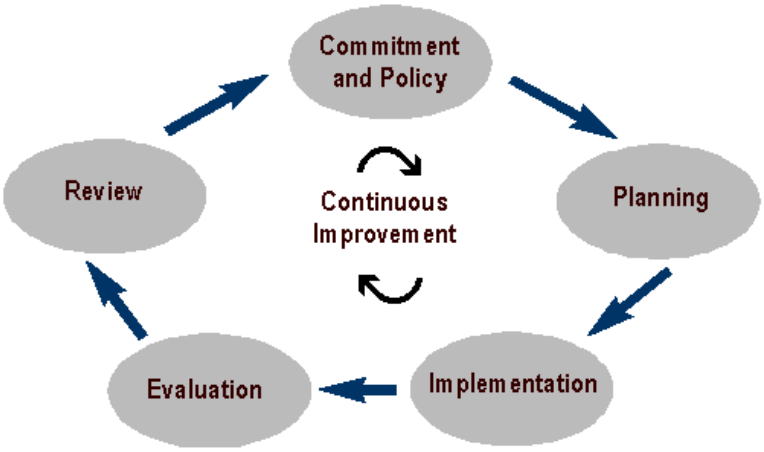

Figure 4. The continuous improvement cycle (Environmental Protection Agency, Environmental Management System, 2014)

The five main stages, as described by the EPA, are:

1. Commitment and Policy

Top management commits to environmental improvement and establishes a company environmental policy. The policy is the foundation of the EMS.

2. Planning

Environmental aspects of its operations are identified and prioritized. Objectives and targets are set to minimize negative impacts. An action plan for meeting targets is developed, and responsibilities are clearly defined to meet the targets.

3. Implementation

The action plan is followed through using necessary resources (human, financial, etc.). An important component is employee training and awareness for all employees. Other steps in the implementation stage include documentation, following operating procedures, and setting up internal and external communication lines.

4. Evaluation

Operations are monitored to evaluate whether targets are being met. If not, the company takes corrective action.

5. Review

Top management reviews the results of the evaluation to see if the EMS is working. Management determines whether the original environmental policy is consistent with company values. The plan is then revised to optimize the effectiveness of the EMS. The review stage creates a loop of continuous improvement for a company.

The Occupational Safety and Health Administration (OSHA) provides a Fact Sheet on the topic of Effective Workplace Safety and Health Management Systems (United States, Department of Labor, OSHA 2014). Critical Elements, and a Safety and Health Management Systems Checklist are described.

The critical elements of an effective SHMS are: management commitment and employee involvement; worksite analysis; hazard prevention and control; training for employees, supervisors and managers. The Checklist includes:

Management Commitment and Employee Involvement:

- Develop and communicate a safety and health policy to all employees.
- Demonstrate management commitment by instilling accountability for safety and health,
  obeying safety rules and reviewing accident reports.
- Conduct regular safety and health meetings involving employees, managers and supervisors.
- Assign responsible person(s) to coordinate safety and health activities.
- Integrate safety and health into business practices (e.g., purchases, contracts, design and development).
- Involve employees in safety and health related activities (e.g., self-inspections, accident investigations and developing safe practices).
- Recognize employees for safe and healthful work practices.

Worksite Analysis

- Evaluate all workplace activities and processes for hazards.
- Reevaluate workplace activities when there are changes in: Processes, Materials, and Machinery.
- Conduct on-site inspections, identify hazards and take corrective actions.
- Provide a hazard reporting system for employees to report unsafe and unhealthful conditions.
- Investigate all accidents and near misses to determine their root causes.

Hazard Prevention and Control

- Eliminate and control workplace hazards (e.g., engineering controls, workstation design and work practices).

- Establish a preventive maintenance program.
- Keep employees informed of safety and health activities and conditions.
- Plan for emergencies (e.g., create an evacuation plan, train employees and conduct fire drills).
- Record and analyze occupational injuries and illnesses.

Training for Employees, Supervisors, and Managers.

- Provide training on specific safe work practices before an employee begins work.
- Provide additional training for new work processes and when accidents and near misses
- occur.
- Provide refresher training on a routine basis.

OSHA notes in this publication that OSHA regulations do not require employers to have a Safety and Health Management System, "OSHA regulations do not require employers to have a SHMS. Thus, the items on this checklist are strictly voluntary with the exception of construction industry employers."

Author Sandy Smith, in the article ANSI Z10-2012 Standard Provides the Blueprint to Create an EHS Management System, describes the American National Standards Institute (ANSI) standard as "innovative and provides management system requirements and guidelines for improving EHS" (Smith 2012).

The author lists seven section topics that ANSI Z10-2012 provides. They are: management leadership; employee participation; planning; implementation and operation; evaluation and corrective action; and, management review. Roles and responsibilities, policy statements, assessment and prioritization, audit information and additional information is provided.

Smith concludes that the standard defines minimum requirements for an occupational safety and health management system and applies to organizations of all sizes and types.

ASSE Standards Development Committee Chair Gary Lopez, CSP, said about ANSI Z10-2012:

> This standard provides critical management system requirements and guidelines for improvement of occupational safety and health. Experts from labor, government, professional organizations and industry formulated this significant standard after extensive examination of current national and international standards, guidelines and practices. From large to small businesses, this standard provides a simple blueprint for creating safer workplaces while contributing positively to the bottom line through reduced health care and workers' compensation costs, production delays and more (Smith 2012),

BS OHSAS 18001:2007 is an international occupational health and safety management systems standard which sets out the requirements for occupational health and safety management. It provides guidance to help design a health and safety framework – that brings all relevant controls and processes into one management system. OHSAS 18001 was adapted by BSI Group, United Kingdom's National Standards Body, in 2007 (BS OHSAS 18001 Revision 2014).

A new ISO standard, ISO 45001, on occupational health and safety management system requirements is being produced by a Project Committee, with the intention of publication in October 2016. The standard will be aligned with ISO 9001 (Quality Management) and ISO 14001 (Environmental Management), which are themselves undergoing revision and are due for publication in 2015.

The project committee responsible for the production of this work met for the first time in London between 21 and 25 October 2013 and produced its first working draft. There are at present approximately 50 countries and international organizations such as the International Labour Organization involved in this work. The committee will meet a number of times over the course of the next three years to develop the new standard and gain consensus from all countries involved (BS OHSAS 18001 Revision 2014). BSI provides the anticipated timescales for ISO 45001, which are subject to change:

- Committee draft Q2 2014
- Draft International Standard (DIS) Q4 2014
- Final Draft International Standard (FDIS) 2015
- International Standard (ISO) Q4 2016

Authors Munro and Luka 2014, provide insight on why many Americans haven't heard much about the British Standards Institute's "new" 18001 standard, and OSHA's perspective. The authors describe United States occupational health and safety as; "highly regulated, having many local/ state/ national laws and regulations, difficult to keep them all straight, and conflicting compliance issues that are virtually impossible to resolve." The authors explain that in many parts of world there are "not nearly the number of regulations or laws affecting occupational health and safety," or "clearly defined safety management standards." When the authors reached out to OSHA, regarding feedback on OHSAS 18001, they were "encouraged to simply use the many resources that are available here in the United States and not to worry about something coming out of Europe." The authors suggest that an organization work with

local OSHA contacts if OHSAS 18001 is considered, and that “many companies with U.S. and international facilities utilize both OHSAS 18001 and VPP (Munro, Luka 2014).

8. Transformational Leadership

Dr. Richard D. Fulwiler, retired director of health and safety worldwide for Proctor and Gamble, and author of Transformational Leadership: The Key to World-Class Safety, describes this leadership style. The author states “there is no finite description of what entails world-class safety, but there is one characteristic that absolutely is essential, and that is the engagement of the work force in the safety process” (Fulwiler 2011). Dr. Fulwiler explains that organizational leaders must become more transformational and less transactional, and further explains that transformational leadership not only drives better safety results, but also better non-safety business results. These results are due to workers being totally engaged not only in safety, but in the entire work process.

The author identifies a transactional leader (TAL) as:

- Has a quid pro quo relationship with the worker, frequently relying on disciplinary action.
- Is task-oriented and focused on regulatory compliance.
- Preserves existing culture, conditions and practices.
- Is likely to focus more on the work than the worker.

Meanwhile, the author identifies a transformational leader (TFL) as:

- Prompts results in which the workers' values align with the leaders' values.
- Empowers the worker to engage in the work process, going beyond their self interest.
- Personally is engaged with the worker and cares about the worker.
- Maximizes the contribution of the worker.

- Focuses on both the work and the worker.

The author explains “the fundamental difference between TAL and TFL is that TFL is primarily focused on the work and TFL is focused on both the work and the worker.”

Provided by the author, is an example at Cintas, of leadership changing from transactional to transformational, and the results attributed from this change in leadership style. The leadership focus at Cintas was heavily transactional before 2006, and then heavily transformational after 2006. The results after 2006, were “not just dramatic improvement in safety, but also in other critical business outputs.” The image below of dramatic improvements results was provided by the author.

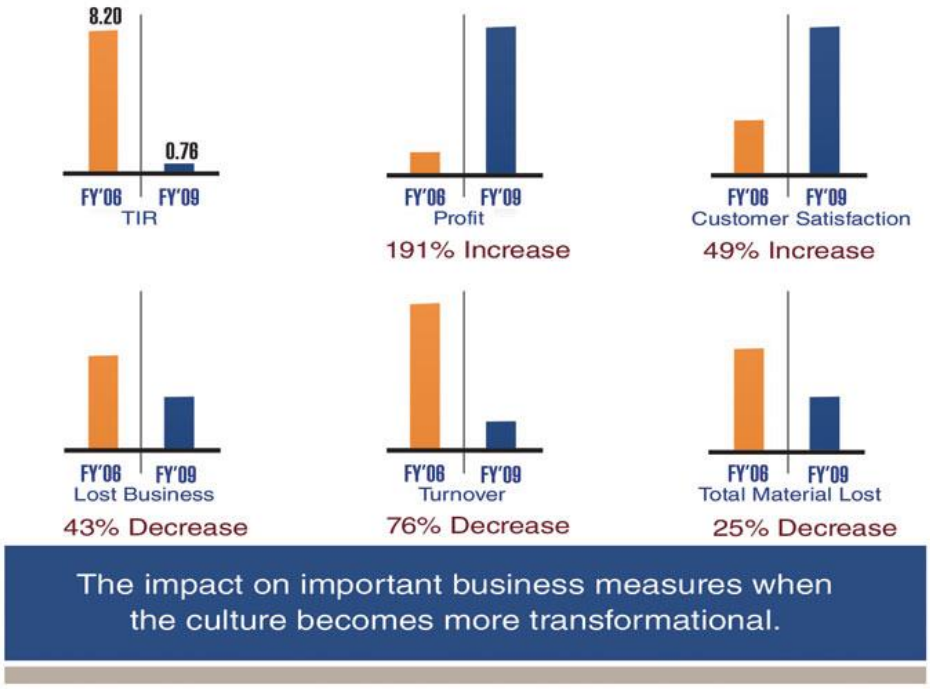

Figure 5. Improvement in safety results but also in other critical business outputs (Fulwiler 2011).

The author concludes by providing a Transformational Leadership Self Assessment for one’s characteristics and asks leadership/ participants to be brutally honest in assessing their rating. The characteristics are; listening, communication, caring, collegial, and engaging. The author, Dr. Fulwiler, states “someone committed to growing their TFL skills should take the assessment

periodically to measure their progress. A 360-degree assessment would include asking bosses, peers and subordinates to conduct the assessment for a given manager."

The TFL, a description of each characteristic, and the rating system, is attached as appendix X.

This article by Dr. Fulwiler, references two additional authors on the topic of transformational leadership, and describes their contribution to understanding this leadership style. Dr Fulwiler, quotes Chris Lowney, in his book, Heroic Leadership, as stating "Individuals perform best when they are respected, valued and trusted by someone who genuinely cares for their well-being." That "someone" needs to be a transformational leader. The second author referenced is, Tom Krause, as doing a "very good job of describing the characteristics of transformation leadership as well as TFL best practices in his book, *Leading with Safety*."

Author, Laura Walter, provides the article Transformational Leadership May Boost employee well being, where she describes "transformational leadership has been praised for stimulating innovation and worker performance," and references a new study that reveals transformational leadership might boost employee mental health and well-being (Walter 2013).

Chapter 4.0 Methodology

Each of the salient elements, actions, and characteristics identified during the literature review as a role or responsibility of the EHS manager in establishing management commitment in one's organization was further researched using a three-pronged approach. The first step involved the researcher's participation in annual EHS conferences and expositions to collect data from relevant presentations and identify potential sources of information; the second step further reviewed the professional literature; and the third step was an in-depth analysis of Chief Executive Officer (CEO) full interviews conducted by the National Safety Council (NSC) for their annual article "CEOs who Get It.".

Each of these three steps is further described as:

4.1 Conference Participation

The American Society of Safety Engineers (ASSE) annual SAFETY Professional Development Conference & Exposition may be the safety, health and environmental professional's most important resource to staying connected with the latest issues and trends in the profession (American Society of Safety Engineers, Safety Conference and Exposition, 2009). The conference provided educational seminars and roundtables where there was specific interest in the following topic & subject tracks: Safety Management, Business Skills, Risk Management, Human Behavior, International Safety & Health, and Key Issues.

The Pennsylvania Governor's Occupational Safety & Health Conference, for more than 80 years, has been Pennsylvania's premier safety and health event, where education, innovation and

best practices converge in a collegial environment that has drawn tens of thousands of workplace safety professionals (Vito 2010).

The annual Region III Voluntary Protection Program Participants' Association (VPPPA) is a regional health and safety conference. The conference provides educational seminars, activities, and roundtables with a focus on VPP. The Region III Board Members that actively participate throughout the conference consist of EHS professionals in various industries, and U.S. and State Department of Labor and Industry Managers, Coordinators, and Officers.

The strategy for collecting relevant information was for the researcher to attend and participate in lectures, round tables, and in discussions with presenters and participants. Individual discussions were conducted with leaders from private industry and regulators on best practices and voluntary protection programs. Follow-up was completed with OSHA VPP coordinators, and industry leaders in; EHS leadership, management commitment, and employee involvement.

The criterion for selecting lectures, round tables, and discussions was based on three factors prior to attending the conference:

1. Reviewing subject tracks available for the general sessions that are aligned with this thesis topic, focus, reason for interest, and research question. The available topics and subject tracks provided by the conferences are: Business Skills & Personal Development, Construction/ Mining, Emergency Management/ Security, Environment/ Hazardous Material, Ergonomics, Fire Protection, Fundamentals/ Spanish, Healthcare/ Wellness, Hospitality, Human Behavior, Industrial Hygiene/ Health, International, Key Issue Roundtables, Oil & Gas, Regulatory Issues/ Government/ Public Sector, Risk

Management, Safety Management, Sustainability, Technical/ Engineering/ Standards, Voluntary Protection Programs. Subject tracks of primary interest were; Business Skill & Personal Development, Safety Management, and Voluntary Protection Programs.

2. Selecting intermediate, advanced, and executive level sessions. These are defined by ASSE as:
    a. intermediate – six to ten years of experience
    b. advanced – 10 years plus of experience
    c. executive – CEOs, presidents and vice presidents, and senior management
3. Reviewing session descriptions, and selecting sessions that may provide the EHS managers role and responsibility in establishing an organization's commitment towards environmental stewardship and workplace safety. The focus was on presenters, participants, champions, and leaders that provided topics and insight on EHS leadership, excellence, management commitment, and best practices to implement an effective EHS program.

Preparing for sessions included identifying articles and literature authored by the presenters, and identifying presenters that would be available as an exhibitor at the Expo. Conference and expo information was recorded with notes, and by collecting distributed material. Key findings were obtained from notes and materials, after completion of the ASSE, PA Governor's, and VPPPA conferences. This prompted additional questions, which resulted in further research of the presenter and session topic. Some presenters and conference participants were contacted for follow-up. Follow-up ranged from immediately after the session at the conferecne, to 1

year after the session to verify any changes in presented information. The following topics were further researched post conference: traditional, current, and evolving role of an EHS Manager, value added voluntary protection programs, and roles/ responsibilities of an EHS Manager that best supports an organization achieving environmental stewardship and workplace safety.

Information and data was organized and coded following the process described in the next section, 4.2 Literature Review.

4.2 Literature Review

The second phase revisited the Rochester Institute of Technologies (RIT) research database. Of the more than 215 databases some were further used to collect data and information on the elements, actions, and characteristics identified as vital to the EHS manager/ leader. The purpose of this research was to further identify and support the vital elements that are identified of an effective EHS manager. The research specifically focused on upper management commitment, and EHS leaders that are recognized as providing superior leadership, and continuous improvements, in driving EHS.

The criterion for selecting literature reviews included:

1. Searching for literature and journal articles through the Rochester Institute of Technology's (RIT) Wallace Library Database Finder provided access to ScienceDirect, Elsevier, Ebsco, and H.W. Wilson.
    a. This access provided literature from: Journal of Safety Research, Journal of Loss Prevention in the Process Industries, Journal of SH&E Research, Journal of

Environmental Sustainability, Safety Science, and International Journal of Project Management.

2. Searching for literature through professional EHS journals, and RIT coursework and texts obtained from the Environmental Management Bachelors of Science program.
    a. Professional EHS journals include: American Society of Safety Engineer's Professional Safety Journal, National Safety Council's Safety & Health Magazine, and EHS Today.
    b. Texts include topics in: Environmental Accounting Management, Sustainability, and Safety & Health Management.
3. Searching for literature on government and non-profit organizations websites.
    a. This includes: epa.gov, osha.gov, iso.org

The process to organize and code data from the conferences, and literature reviews, began with an excel document with the following columns:

Item Number	Reference Number	Section, Primary	Section, Secondary	Category	Page Number	Notes	Quote	Other

Details for these columns are:

- Item Number – "1" through "100" plus identifies each line item in the rows of the excel document.
- Reference Number – "REF:1" through "REF: 40" identifies the text book, magazine, conference session, or journal article. Each item, that was hard copy or electronic, was labeled with this REF number.
- Section, Primary - identified the safety conference, conference or literature title, magazine article, or text title.
- Section, Secondary – identified conference or literature applicable to the section in the thesis. For example, background, conference, literature review, and key findings.

- Category – identified the line item as; business case, case study, voluntary protection program, community, green initiatives, OSHA, EPA, financial, business case, leadership, risk analysis, executive role, or culture.
- Page Number – identified the page number in the literature.
- Notes – description of the finding
- Quote – specific key quotes
- Other – additional information

This process lead to the eight sections identified in Section 3.0 (Evolving Role of EHS Manager, Business Case for EHS, Practices for Safety Leaders: What Great Safety Leaders Do, Critical Success Factors Influencing Safety Programs, Management Commitment, Voluntary Protection Programs, Management Systems, and Transformational Leadership), and the excel document transformed to initial drafts of the thesis.

4.3 Published NSC Interviews

National Safety Council (NSC) publishes annually, the statements of approximately six to eight leaders who "Get it." These leaders include Chief Executive Officers (CEOs), Chief Operating Officers (COOs), General Managers, and Officers of the United States Military. National and international organizations of all sizes from a wide variety of industries and locations are represented. These leaders are guiding their organizations, and understand the crucial role leadership plays in creating a culture of safety. This leadership is demonstrated by visibly being committed to safety, engaging employees in safety at all levels and encouraging employees to take their safety knowledge home. Beyond leadership commitment, these leaders also demonstrate the other critical elements of the Journey to Safety Excellence – safety management systems, continuous risk reduction, and performance measurement. (NSC.org) From 2009 to 2013 the NSC published more than forty five interviews with organizational leaders, and asked the following questions consistently:

(1) Why is safety a core value at your company?

(2) What is the biggest obstacle to safety in your workplace, and how do you work to overcome it?

(3) How do you measure safety? What are the leading indicators that show you how safe you are, and where do you see room for improvement?

(4) How do you instill a sense of safety in your employees on an ongoing basis?

All leaders recognized from 2009 to 2013 were reviewed and assessed for elements, actions, characteristics in establishing an organizations commitment towards environmental

stewardship and workplace safety. The similarities and frequency in responses was noted, and is presented as a key finding. Additionally, the interviewee's organization was searched in OSHA's database for participation in the OSHA Voluntary Protection Program.

All key findings from the EHS conferences, literature reviews, and published interviews are presented in the next section, 5.0.

4.4 Analysis

Validity of the key findings was established by triangulation; comparing the interviewee's response to multiple archived literacy and/or conference and exposition sources (Morelli 2013, 83).

The data from each source was sorted and compiled from handouts, notes, and information available on-line. The detailed presentation documentation was obtained from notes during the presentation, additional literature recommended by the presenter, conference handouts, and information available post conference on-line.

Data was sorted and compiled to compare and contrast by identifying a potential role or responsibility of an EHS manager that he or she may, must, or should directly or indirectly champion.

Criteria used to decide when a finding was representative of the thinking of the discipline, was based on being value added, an improvement or success, to excellence in EHS management (improving worker safety and environmental stewardship). A minimum of three instances of a particular belief or concern was identified from literature reviews, interviewees with leadership, and conference presenters, to establish the belief or concern as representative.

Divergent opinions where identified, with the majority being in interviewees with leaders, and these opinions were categorized if provided by multiple leaders, or identified as divergent. Findings that were identified as less than certain, where tagged and identified in key findings.

4.5 Quitting the Field

When new data was consistent with the hypothesis or explanation, required no modification, and provided no new surprises, the study reached a point of theoretical saturation. It was time to review what has been done and end the project. The work ended when a point of diminishing returns was reached to the extent that new information duplicates what already is known and no significant modification to the hypothesis or explanation is required (Morelli 2013, 84)

Chapter 5.0 Conference Findings

5.1.a Collected Data from Conference Attendance & Participation

Data collected includes: personal perspective from motivational speakers, relevant presentations, and discussions on voluntary protection programs.

Motivational & Keynote Speakers

In 2010, motivational speaker Charlie Morecraft delivered the keynote address at the Pennsylvania Governors Occupational Health and Safety Conference. Charlie, a former oil refinery worker, told us his own powerful story of the tragic consequences he endured because of a lapse in workplace safety. Charlie provided that the single most important reason for the incident that lead to his painful injuries and consequences over the past 30 years was "his, …and not management's, …and not the organization's, …but his attitude."

In 2011, Captain Scott O'Grady delivered the keynote address at the Pennsylvania Governors Occupational Health and Safety Conference. Captain O'Grady, an Air Force fighter pilot, was shot down in his F-16 over Bosnia while helping to enforce the NATO no-fly zone. He shared details of the six-day, life-or-death ordeal that inspired millions and taught us about preparation, teamwork and leadership. He explained it is those qualities that are crucial to success in every facet of business and life. Captain O'Grady explained how he chose not to follow a procedure during his pre-flight checklist, and how this deviation nearly cost him everything.

At the 2010 Pennsylvania Governor's Occupational Safety & Health Conference, Assistant Secretary of Labor for Occupational Safety and Health, Dr. David Michaels states that America doesn't need more refinery explosions, trench cave-ins or factory fires. The speaker explains that the [United States] needs more companies —

- acting responsibly and following the law;
- giving their workers training and protective equipment;
- providing OSHA with accurate reports when workers are injured or taken ill, and
- pursuing a culture of safety and health on the job every day of the year (Michaels 2010).

Leadership Session Presenter

According to Thomas Krause (2009), presenter at the (ASSE) SAFETY 2009 Professional Development Conference & Exposition, Krause cites his work entitled *"Ten Characteristics That Distinguish Great Safety Organizations: What Leaders Do to Make Them Real"* (Krause 2009). He identifies ten characteristics shared by great safety organizations, why they are important, what the barriers are, and what leaders do to make them real. From 2006 to 2009, Thomas R. Krause and his colleagues worked with hundreds of companies to focus on culture and leadership's role in safety performance. Drawing on the research of these efforts, and the experience of thousands of leaders and leadership teams, they identified ten characteristics

(Krause 2009). He provides the following ten characteristics shared by great safety organizations:

1. Develop a Vision for Safety and align leadership around it.
2. Measure climate, culture and safety leadership capability on an ongoing basis.
3. Stop doing the things that create poor organizational culture and safety climate.
4. Engage each level of employee in significant safety interventions--front line, middle, senior leader.
5. Move the focus of the organization from injuries to exposure for injuries.
6. Understand the role of behavior
7. Develop valid leading indicators
8. Focus on serious injuries and fatalities as a category
9. Address contractor safety with the same rigor as employee safety
10. Instill Personal Safety Ethic in each of your leaders.

Each of these ten characteristics is further explained at the conference, and through his work, in detail by Krause 2009 and 2014. Krause also explains what leaders do to make this a real organizational characteristic "in very concrete terms" (Krause 2009 and 2014).

1. Develop a *behavioral vision* for safety and align top leadership around it.

According to Krause, great safety organizations develop a behavioral vision that is different from the bulleted "vision" list that does little to alter the climate and create the required culture for safety. This behavioral vision answers the question: what observable and

replicable behaviors will define the future state of safety? Critically, the safety steering team and the senior leaders then lead by example so that safety [vision] initiatives become more than another project to be outlived by employees" (Krause 2009).

Krause then bullets, what leaders do to make this a real organizational characteristic:

- Create a "clear cut" Vision for Safety: leadership involves and engages employees in this process
- Recognize variation from the vision and respond
- Stimulate active problem solving to overcome barriers
- Talk about the vision every day, with enthusiasm

2. <u>Measure climate, culture and safety leadership capability on an ongoing basis.</u>

Climate and culture are used in overlapping ways, but often are quite different. Culture refers to the unwritten assumptions that influence decision making, attitudes and beliefs, and guides the behavior of those in the culture. Culture is general, unstated, and an assumed way of doing things, that changes slowly. Krause provides a bulleted list of descriptions to further differentiate climate and culture:

Climate	Culture
• Perceptions of what is expected, rewarded and supported	• Common values that drive organizational performance
• Applies to a specific area of functioning	• Applies to many areas of functioning
• "What we pay attention to"	• "How we do things"

- Stated
- Foreground
- Changes more rapidly
- Unstated
- Background
- Changes more slowly

What leaders do to make this a real organizational characteristic:

- Respond where gaps are evident between the vision and the data.
- Require that leaders have action plans for improvement.
- Share your own safety leadership profile.
- Understand the relationship between climate, culture and leadership.

3. <u>Stop doing the things that create poor organizational culture and safety climate.</u>

Krause explains that there are many ways in which organizations inadvertently undermine the inherent motivation that leaders have to improve safety. In some cases they can demotivate leaders through how safety is managed. Krause provides the following examples and conclusion:

i. Focus on injuries while ignoring exposure.
ii. Talk about zero injuries while ignoring safety issues
iii. Make all bonus compensation contingent on recordable rates
iv. Ask for input on safety and don't respond
v. Block upward communication about safety issues
vi. Blame lower level leaders for systems they can't control
vii. Mis-classify injuries to make the numbers look good

viii. Make safety number on the agenda and then trivialize it.

These examples can demotivate by introducing barriers to effective safety leadership. Great safety organizations recognize the realities that leaders face and align organizational systems, processes, and strategy to support consistent safety leadership.

Krause does not provide a bulleted list of what leaders do to make this organizational characteristic real, but explains that one should recognize these examples and ensure leadership takes appropriate corrective action.

4. Engage each level of employee in significant safety interventions (understand the "Safety Perspective" of each level)--front line, middle, senior leader.

Krause explains that the way to get employees engaged and involved is to "give them stuff to do, make them part of the action, make them part of the solution." It's not about getting motivated, employees are already motivated not to get hurt. The question is how does the employee get into the system that is positive, and so the task is to find ways every level of employee can get involved in significant safety efforts.

Krause also claims that intrinsic motivation (motivation at a personal level) connects people on multiple levels — the intellectual, the emotional, the creative, and the psychological — with the work they do. This connection is predicated on what each person brings to safety: what safety means to him, what prompts him to become involved in it, and what he would like to get out of it.

Next, Krause (2009) provided a look at what safety means to the person we are trying to engage; the meanings vary from level to level, just as the experience of safety – and its outcomes – differ at each organizational level. With this understanding, one can define activities and interactions that capitalize on these intrinsic motivations and make them active:

> **Senior executive;** Fatalities are a primary issue. Cost is not usually the issue, and the strongest motive is broad culture change.
>
> **Facility manager;** Fatality exposure is an issue. What is important to the people above me, and how do I motivate the organization for safety excellence?
>
> **First-line supervisor;** Looking out for my folks, large variation across employees, and lack of confidence regarding safety leadership skill level.
>
> **Front-line employee;** Safety means my well being, it is personal, interest level is high, frustration with "programs" and inconsistencies, results are visible evidence, not numbers.

What leaders do to make this a real organizational characteristic:

- Front line: Understand and support front line safety interventions, but avoid meddling
- Middle: Know the critical behaviors of middle level leaders and engage with them
- Senior: Require high Personal Safety Ethic. Provide coaching as needed.

5. Move the focus of the organization from injuries to exposure for injuries.

Keeping employees safe requires putting into place reliable systems that are operating well and used consistently across the organization. Employees must communicate and collaborate with each other, across departments, between shifts—even when their immediate interests may be in conflict. This level of functioning requires the collaboration and coordination of employees at every level of the organization. Workers are present at the point of exposure and are critical to safety improvement, but there is a limit in the scope of their impact. Leaders can make decisions about resources and organizational direction, but they are limited in their ability to enact the particulars of work at the front line. Supervisors and middle managers must express the organizational culture and priorities to the workforce while managing and representing that workforce to the larger organization. Great safety organizations address the needs of each of these levels with appropriately designed interventions. When these activities work in concert, front-line employees, middle managers, and senior leaders are respectively enabled to reduce exposure within their everyday roles.

What leaders do to make this a real organizational characteristic:

- Learn where the exposure for injury is
- Emphasize near miss reporting and investigation
- Do root cause analysis broadly and properly
- Respond to near miss data

- Understand that exposure reduction is injury prevention

6. Understand the role of behavior

Krause explains that a highly significant issue anytime behavior is applied to safety, is the perception that someone is to blame.

What leaders do to make this a real organizational characteristic:

- Understand the sensitivity to the word “behavior”.
- Understand that “safe behavior” refers to all levels of employees, especially senior leaders.
- Understand that behavior always interacts with systems, leadership and culture.
- Enable safe behaviors, don’t blame employees.

7. Develop valid leading indicators

- A model that BST developed that provided lower incidence rates includes the following leading indicators:
    i. Observer Training
    ii. Employee Knowledge
    iii. Manager / Supervisor Knowledge
    iv. Employee Participation
    v. Quality of Observations and Feedback
    vi. Contacts (frequency of employees were made contact with issues)
    vii. Coaching

viii. Barriers Removed (formal strategy, is there a process for identified barrier removal)

What leaders do to make these real:

- Set standards for what qualifies as a leading indicator
- Test potential leading indicators for predictive power
- Monitor proven leading indicators and respond to them as you would injury data
- Validate it

8. Focus on serious injuries and fatalities as a category

Define and measure the serious injury rate and fatalities. Investigate the root cause of that category of incident.

What leaders do to make these real:

- Measure serious injury and fatalities rate
- Understand the root causes of this category incident
- Design interventions centrally and implement locally
- Form a task team

9. Address contractor safety with the same rigor as employee safety

What leaders do to make it real:

- Create alignment between host and contractors on:
    - Safety objectives
    - Leadership behaviors
    - How non-compliance will be handled

- Performance measurement and reporting
- Essential climate and culture attributes, and
- Strategy for motivation of safe behavior and activities.

10. Instill Personal Safety Ethic in each of your leaders.
    a. Self-Awareness
    b. Empathy
    c. Contact
    d. Responsibility
    e. Impact

Business Skills Session Presenters

According to Jerry L. Williams, CSP, CPEA, Siegel-Robert, Inc., at the business skills session "Developing and Measuring a Safety Business Plan," attendees learned skills in developing projections to future states as it relates to the cost of liabilities. The session showed how to set priorities based on facts and projections and how to create an action plan for each priority and develop a team to address each priority. The session addressed how to project manage the action teams, gather the information needed, and develop a plan of implementation for the action plan (Williams 2009).

According to Mark D. Hansen, P.E., CSP, CPE, CPEA, Range Resources Corporation, at the business skills session "Business Lessons for the SH&E Professional Sponsored by the Business of Safety Committee," attendees learned that a safety professional needs to be a business

person who understands SH&E. If we can demonstrate how we bring the two together, we become an added value to the business team. This makes us more effective as SH&E professionals. The session addressed business lessons, good employee rules and commitment to profit (Hansen 2009).

According to Winnie Ip, CPE, Humantech, at the business skills session "ROI of Ergonomic Improvements: Demonstrating Value to the Business, Sponsored by the Ergonomics Branch of the Industrial Hygiene Practice Specialty," attendees learned that demonstrating pay back on safety programs is an ongoing challenge for many safety professionals. Showing the value of an ergonomics program and individual workplace improvements is a part of that challenge, especially when only the traditional lagging measures are used. The session demonstrated proven methods for calculating return on investment, and demonstrating value and pay back to an organization (Ip 2009).

According to Mark A. Friend, Ed.D., CSP, Embry-Riddle Aeronautical University, at the business skills session "Cost Analysis and Budgeting: Risk Analysis and Hazard Control," the session presentation discussed cost analysis and budgeting from a safety management perspective, explained the mechanics of the budgeting process, identified methods of loss control, and pointed out simple approaches to cost determination. The time value of money, and simple math calculation were run. The expected value technique of ranking priorities was addressed and explained. The presentation began with simple qualitative methods of evaluating risk, and concluded with easy methods quantify loss exposures (Friend 2009).

According to Joel M. Haight, Ph.D, P.E., CPS, CIH, The Pennsylvania State University, and Samuel A. Oyewole, The Pennsylvania State University, at the business skills session "Making the

Business Case: Assessment of Safety Intervention and Optimization of Resource Allocation Sponsored by Engineering Practice Specialty," the session provided an overview of statistical techniques to assess safety intervention programs from a business-oriented perspective. A mathematical model was developed to minimize incident rates and better predict allocation and optimization of resources in order to minimize safety costs (Haight, Oyewole 2009)

Voluntary Protection Program Speakers

Department of Labor and Industry, Voluntary Protection Program Coordinator, Milford Stern, at the 2012 and 2013 Region III Voluntary Protection Program Participants' Association (VPPPA) regional health and safety conference, presented Introduction to VPP (Stern 2013). He described the VPP Process to Star (adapted from the VPP Challenge Initiative), and stages, elements, actions leaders can take (Directorate of Cooperative and State Programs | OSHA Challenge Program, 2013). Stages, elements, and actions are described as:

1. Management Leadership and Employee Involvement – demonstrate visible, serious, and committed safety and health leadership by publicly accepting ultimate responsibility for safety and health in the total site and taking other appropriate actions to begin developing a culture, creating systems, and establishing policies and procedures that support a safety and healthy work environment in the total site. The desired outcomes and required actions for this element include:
    a. Management Commitment - Mission and Policy Statements, Leadership by Example, Resources, Goals and Objectives, Responsibility, Authority, and Accountability, Communication, Disciplinary Plan, Annual Self-Evaluation

b. Employee Involvement – Employee S&H Perception Survey, S&H Practices Change Plan, Employee Notification, Meaningful Employee Involvement

c. Contract Worker Coverage – Adherence to Rules, Contractor Selection, Contractor Hazards, Removal Policy

2. Worksite Analysis – develop a system from identifying basic and unforeseen safety and health hazards, evaluating their risks, prioritizing them, and recommending methods to eliminate or control hazards to an acceptable level of risk. The desired outcomes and required actions for this element include:

    a. Baseline Safety and IH Hazard Analysis, Hazard Analysis of Routine Jobs, Tasks, and Processes, Hazard Analysis of Significant Changes, Pre-use Analysis, IH Program, Routine Self-Inspections, Employee Hazard Reporting System, Investigation of Accidents and Near-misses, Trend Analysis

3. Hazard Prevention and Control – develop systems to prevent and control hazards in the total site. The desired outcomes and required actions for this element include:

    a. Certified Professional Resources, Hazard Elimination and Control Methods, Hazard Control Programs, Documented System for Hazard Correction Tracking, Preventative Maintenance, Occupational Health Care Program, Emergency Preparedness and Response

4. Safety and Health Training – provide training to safety and health and other staff to help them acquire the knowledge and skills they need to perform their safety and

health responsibilities in the total site. The desired outcomes and required actions for this element include:

   a. General guidelines, Training for all workers, Training for specific groups of workers

5. Documentation – submit documentation that demonstrates the desired outcomes and required actions.

OSHA provides further information on the above stages, elements and actions for general and construction industry with the VPP Challenge Initiative (Directorate of Cooperative and State Programs | OSHA Challenge Program, 2013), and by previewing the Site-based Participation Evaluation Report (VPP Site-Based Participation Evaluation Report, 2013).

5.1.b Key Findings from Conference Attendance & Participation

Key findings from conference attendance and participation, to identify the roles and responsibilities of an EHS Manager that best supports an organization achieving environmental stewardship and workplace safety, include:

1. The variety and depth of annual state, regional, and national conferences and expositions for the EHS professional, and employee interested in EHS. Additionally, the variety and depth of speakers and topics on EHS. Conference attendance and participation develops and keeps the EHS manager current on several EHS subjects.

2. Speakers Charlie Morecraft, Scott O'Grady, and Dr. David Michaels describe how positive employee attitude, conformance with procedures, and pursuit of a health and safety culture is important to workers and workplaces.

3. Krause points out that not all high performing, multiple location organizations, have all of the 10 different characteristics at every location, but those that are highly successful in safety have most of the characteristics at most locations. Each characteristic is actionable for the EHS manager and organization. The common underlying thread to these characteristics, and the true key to their success, is the commitment of senior leadership to driving the development of these traits and to creating a truly great safety organization as provided by Krause 2009.

4. Krause did not provide within his ten characteristics, a business case characteristic, although many sessions at ASSE 2009 presented the business case as an important role of EHS leaders.

5. The OSHA Voluntary Protection Program has many actionable items for leadership beyond regulatory compliance, and the OSHA VPP Coordinator is actively seeking facilities that would like to pursue OSHA VPP. Resources such as Mentors are available for facilities following the Challenge Assessment.

5.2 Literature Review

5.2a Key Findings from the literature

Key findings from the literature review, to identify the roles and responsibilities of an EHS Manager that best supports an organization achieving environmental stewardship and workplace safety, include:

1. Powerful quotes and references that highlight the effective characteristics and attributes of the organization and management committed to EHS excellence. The literature review provides key findings, in no particular order, with; top management commitment, good communication, business case for EHS, understanding of company culture and climate, participation in voluntary protection programs, use of leading indicators, evolving roles of the EHS manager, employee engagement, traditional and transformational leadership, social responsibility, and the efficiency of safety management systems.
2. Successes in EHS with the implementation of projects, strategies, and practices, and the additional non-safety related outcomes realized.
3. Added value to the organization, as the EHS manager evolves in building strong relationships and policies, and management systems.
4. Improving workplace safety and environmental stewardship, through the significant and growing practice of monetizing EHS initiatives, actions, and policies.
5. The attitudes, behaviors, commitment, and leadership practices that correlate positively with good EHS outcomes.
6. The benefit and positive impact of participating in voluntary protection programs.
7. The efficiency, reliability, and validity, of EHS management systems.

8. Negative perceptions and damaging impacts to organizations that demonstrated a lack of commitment and effectiveness with EHS, and how rapidly enforcement, legal, and media negatively affected the organization.

These key findings summarize the roles and responsibilities of an EHS Manager.

5.3 CEO Interviews

5.3.a Collected Data

The National Safety Council (NSC), from 2009 to 2013, published more than forty-five interviews with organizational leaders. Janet Froetscher, president and CEO, NSC explains

> each of these leaders understands that safety is not only the right thing to do, but also a business imperative. They have a firm grasp of the four pillars of the Journey to Safety Excellence – Leadership and engagement, safety management systems, continuous risk reduction, and performance measurement – and have created a culture of safety throughout their organizations (Froetscher 2013, 1).

Collected data from in-depth analysis of the interviews includes: the similarities/ differences, and frequency in similar responses, to the consistent questions asked by the NSC. Traditional, non-traditional, unique and exemplary responses are listed below. The identification of leaders that contribute their EHS successes to national and international voluntary protection programs or voluntary standards, was also identified.

The first question asked of all forty five interviewees, "why is safety a core value at your company," appeared to include similar responses grouped into the following categories:

W1. EHS is an equal aspect of the organization, a top priority, and/ or a part of the culture

W2. Positive financial contributor

W3. Employee as a valuable asset

W4. Moral and ethical commitment

W5. Zero injury/ incident target, and other.

Within these above mentioned categories, W1 through W5 below provide paraphrased statements from the leaders to "why is safety a core value at your organization:"

W1. EHS is an equal aspect of the organization, a top priority, and/ or a part of the culture:

1. safety is a critical factor to all company values (Jaehnart 2012),
2. one of our corporate objectives (Khalifa 2011),
3. one of six core values (Harrington 2011),
4. safety is the cornerstone of operational excellence (Hess 2011),
5. is key to the accomplishment of our vital national security role (Roggero 2011),
6. our safety program is a reflection of how our organization presents itself and should mirror the same degree of professionalism and aspiration for excellence as other business practices (Hebert 2011),
7. bedrock for everything that we do (Stubits 2009), and
8. safety is a part of our culture and considered with each decision made by management (Gribbins 2012).

W2. Positive financial contributor:

1. the stewardship of a safe workplace is a key business driver (Seaton 2013),
2. excellence in safety and environmental, must be present for a business to exist long-term (Hannan 2012),
3. the vision to create long term value (Hannan 2012),
4. superior safety culture and performance will yield competitive advantages in the market (Harrington 2011),
5. when full embraced, has the benefit of adding much more to the bottom line than the cost (McGough 2010),
6. critical driver to improve our productivity and performance, which makes us more competitive and fuels our growth as a business (McNerney 2010),
7. maintain competitive business (Bryant 2009),
8. business success at the expense of life or livelihood of anyone in our supply chain is not, in truth, success (Rogers III 2009),
9. provides business competitiveness (Whitener 2009),
10. productive and contributes to improved customer service (Staffieri 2009),
11. outstanding safety and project execution are inseparable indicators of our success (Zarges 2010), and
12. how we as a company and our employees will continue to succeed through the current economic downturn and through recovery (Nosbusch 2010).

W3. Employee as valuable asset.

1. employees health and well-being and sharing knowledge with the general public (Sims 2013),
2. essential to our own well-being (McNerney 2010),
3. employees and their families are by far what we treasure most (Nobbe 2010),
4. most precious cargo in the world (Lockhead 2009, Bellagamba 2009),
5. value people over "things" (Rogers III 2009),
6. to protect valued co-workers, and equipment and systems (Bristol 2013),
7. a profound responsibility to provide a safe workplace (Sarles 2013),
8. our people are our No. 1 asset (Batrack 2012, Livingston 2012, Khalifa 2011, Massey 2011),
9. belief that no one should have to get hurt (Frost 2012),
10. we care about our employees (Yoh III),
11. ensure safety and welfare of all employees and family members (Talleri 2013, Zarges 2010), and
12. returning home safely (Wright 2013, Bell 2012, Vetter 2010, Studdert 2009, Whitener 2009, Jinks 2010).

W4. moral and ethical commitment (Massey 2011, McGough 2010), and

1. right thing to do (Fulton 2009, Mullholand).

W5. Other statements include

1. a top priority, an underlying expectation (Fox 2013),
2. an employee culture (Orlando 2013),
3. zero injury/ incident target (McIntire 2011, Swanson 2010),
4. safety is not an option (Miller 2009), and
5. a positive image in the community and industry, a good relationship with regulators, a lack of negative media coverage, and strengthening the bonds among all employees and contractors (Staffieri 2009).

Appendix B provides a table that lists the leader and organization in the year in which they were recognized by the NSC, and provides which leaders responded with like comments to the questions asked. NOTE: The significance of "W1" through "W5" is how this ties into the table

of Appendix B. For example, the column labeled as “W1” displays all organizations that responded within the category “EHS as an equal aspect of the organization, a top priority, and/ or part of the organizational culture.”

With regard to the second question asked of all interviewees, “what is the biggest obstacle to safety in your workplace”, responses are grouped into the following categories:

O1. Complacency, autopilot

O2. Hazard recognition and control

O3. Funding

O4. Safety knowledge/ education

O5. Other

The following items O1 through O5 provide paraphrased statements from the leaders responses to “what is the biggest obstacle to safety in your workplace,” within the above mentioned categories O1 through O5.

O1. complacency, auto-pilot (Sarles 2013, Frost 2012, Livingston 2012, McIntire 2011, Harrington 2011, Hess 2011, Roggero 2011, Hebert 2011, Vetter 2010, Nobbe 2010, Bryant 2009, Miller 2009)

O2. hazard recognition (Fox 2013), hazard recognition and control (Orlando 2013, Wyatt III 2012)

1. perception of risk and even-handed implementation (McGough 2010),
2. unrecognized risk (Fulton 2009), and
3. apathy and unsafe behaviors (Lockhead 2009).

O3. funding (Bristol 2013)

1. budget constraints (Sims 2013, Talleri 2013), and

2. using resources efficiently (Talleri 2013).

O4. different levels of safety knowledge and commitment (Seaton 2013), safety education (Batrack 2012)

1. their decisions affect not only them, but their families, friends, co-workers, their co-worker's families, and the viability of the company as a whole (Mullholand 2009).

O5. Other

1. communication (Sims 2013, Wright 2013, Frost 2012),
2. Attitude (Khalifa 2011, Massey 2011),
3. customer's knowledge (Bell 2012),
4. differing laws and standards across several countries (Jaehnert 2012),
5. continuous improvement (McGough 2010),
6. actively engage all employees (McNerney 2010, Vetter 2010),
7. get everyone to be a safety leader (Lockhead 2009),
8. culture (Stubits 2009),
9. integrating safety into everything they do (Studdert 2009),
10. customer facilities and sometimes customer supervision (Yoh III 2009), the aggressive nature of the driving public (Bellagamba 2009), and
11. off duty activities (Wolf 2011).

The second part to the above question, "how do you overcome the biggest obstacle to safety in your workplace" was analyzed from all interviews that described complacency (auto-pilot), hazard recognition, and funding. Paraphrased responses to "how do you overcome" by each category are:

1. complacency, auto-pilot, apathy and unsafe behaviors, sustaining momentum
    a. incorporate awareness into daily routines through safety briefings, peer-to-peer contact, good supervision, and partnership with the safety department staff (Sarles 2013),
    b. recognize and celebrate success, focus on known high-risk periods, developed 100 Days of Summer (Frost 2012),
    c. regularly scheduled safety meetings, onsite visits and impromptu meetings during the lunch all contribute to reinforcing safety as a routine(Livingston 2012),

d. maintain awareness, heighten awareness around potential hazards, encouraging employees to report “near misses” (McIntire 2011),

e. Increased engagement with employees, weekly safety bulletins and “Lessons Learned” (Harrington 2011),

f. Continually building awareness, communicating about the importance of safety, and recognizing progress and success (Hess 2011),

g. a huge strategic communication effort to involve our leaders at every level and ensure everyone was aware (Roggero 2011),

h. challenge complacency by raising the bar, setting and reviewing standards, proper planning, face-to-face contact, positive reinforcement, safety professionals working alongside our superintendents (Hebert 2011),

i. fully engage everyone in a variety of ways (Vetter 2010),

j. emphasize doing the job correctly with proper tools and procedures, and employees change work stations hourly, daily, or weekly to combat complacency (Nobbe 2010),

k. emphasize the importance of eliminating shortcuts and using the proper tools, awareness of consequences (Bryant 2009),

l. safety communications emphasize the message of staying focused and analyze every job for safety standards, take care of details, raise awareness (Miller 2009), and

m. challenge everyone to become a safety leader, create safety from the top by demonstrating “active caring” and visible leadership, hold managers accountable (Lockhead 2009).

2. hazard recognition, hazard recognition and control, perception of risk and even-handed implementation, unrecognized risk

    a. developed “Safe-Think” process, that encourages employees to pause a moment, and think about the task, assess the hazards, and decide on an approach (Fox 2013),

    b. Mentoring program for the first 90 days, morning stretch and flex, reinforce there is no need to rush, challenge employees to always be aware, most importantly, to each how to become a safety leader, training, communication and constant vigilance (Orlando 2013),

    c. Proactice focus on the impact of human factors and organizational behavior (Wyatt III 2012),

    d. Improve communication at all levels, reinforce the safety partnership between co-workers and their supervisors (McGough 2010), and

    e. On-line risk recognition training and continuing communication on the importance of risk recognition (Fulton 2009).

3. Funding, budget constraints, using resources efficiently

a. Maximizing legacy systems by making sure employees have the safety training and protective equipment necessary. Developing a 10 year Get-Well plan that covers the entire National Airspace System, engineering safety considerations into new technologies to overcome costly facility and systems re-work (Bristol 2013),
b. Having an engaged nine-member Board of Trustees that oversees the cooperative, about every five years, the board and management staff participates in a strategic planning initiative with an outside facilitator, made it clear that safety is just as important as the financial strength of the organization (Sims 2013), and
c. Communicating safety goals and expectations can greatly reduce mishap costs, rely heavily on managers and supervisors to ensure the integrity of the safety program, chair a quarterly Safety Council where updates are received, reduction in the safety program to offset areas with limited resources is not an option because safety equates to mission success (Talleri 2013).

The next question "how do you measure safety? What are the leading indicators that show you how safe you are, and where do you see room for improvement?" was analyzed from all interviews. Due to the variety of responses, data presented is only from 2013, and responses from 2009 to 2012 that appear to be unique or exemplary. Additionally, many leaders from 2009 to 2013 described the use of lagging as well as leading indicators (Fox 2013, Seaton 2013, Wright 2013, Frost 2012, Hannan 2012, Liveris 2012, Batrack 2012, Jaehnert 2012, Harrington 2011, Massey 2011, Hess 2011, McIntire 2011, McNerney 2010, Nosbusch 2010, Vetter 2010, Fulton 2009, Mullholand 2009, Lockhead 2009, Studdert 2009, Whitener 2009), and some provided only lagging indicators (Sims 2013). Leading indicators provided are included in the following four categories.

1. 2013 responses
    a. Daily inspections, job observations, audits, root cause analysis, hazard recognition and control techniques, near miss reporting, process hazard analysis, work orders, and a quarterly snapshot (Orlando 2013),
    b. Monitoring of safety training, participation of supervisors, superintendents on safety audits and inspections (Fox 2013),
    c. Safety inspections (Bristol 2013),
    d. In depth inspection checklist, seatbelt usage (Talleri 2013),

e. Training, HSE plan development and coordination, hazard identification and elimination, pre-task planning, management in action, effective implementation of recognition and disciplinary program, site observations (Seaton 2013),

f. Field inspection, audits, issues identified at safety meetings with front-line employees, our Safety Measurement System, employee hot line calls and time to address to resolution, hazard identification and management to resolution, employee communications, leadership site visits, and superintendent action reports at meetings (Sarles 2013),

g. Conducting and tracking workplace site inspections, job hazard analysis audits, near misses, and "Safety Communications Lessons Learned" documents and communications, along with the number of Good Catch/ Good Save cards turned in to management by region (Wright 2013), and

h. Michael L. Sims does not appear to provide leading indicators (Sims 2013).

2. Climate/ Culture Assessment
    a. Safety climate, and the environmental climate (Frost 2012),
    b. Relative Cultural Strength Score (Harrington 2011), and
    c. We use both soft and hard metrics. The soft metrics are related to the culture of safety intervention (Studdert 2009).

3. Off Duty
    a. Tracking off-the-job injuries, which helps determine how well we are building a robust safety culture that is 24/7 (Yoh III),
    b. We measure two main categories: on and off duty (Roggero 2011), and
    c. Soldiers lost to privately owned motor vehicle accidents (Wolf 2011).

4. Other
    a. Leadership engagement and a healthy workplace (Liveris 2012).

Some leaders stated that they are continuing to improve these "measures" (Batrack 2012, Hess 2011, McNerney 2010, Mullholand 2009).

The next question "how do you instill a sense of safety in your employees on an ongoing basis?" was analyzed from all interviews and provided the following responses. As with the previous

questions, these responses also included much variation. Some of the paraphrased responses include:

1. We teach safety leadership and develop everyone's sense of responsibility (Orlando 2013),
2. Awareness training to reinforce individual responsibility, near miss/ good catch program, safety performance in evaluations (Fox 2013),
3. Campaigns to heighten awareness (Bristol 2013),
4. Establishing policy, conducting training, and executing program management (Telleri 2013),
5. Clearly outline our HSE expectations and philosophy (Seaton 2013),
6. Listening and commitment (Sarles 2013),
7. Learning and following all our safety policies and practices. Employees are encouraged to recommend improvements (Wright 2013),
8. We have many safety activates, process and documents that enhance our safety efforts (Sims 2013),
9. It all starts at the top, the head of the organization has to be committed to the belief that all incidents are preventable (Frost 2012, Harrington 2011),
10. Engagement in safety by every employee. For leaders it goes beyond that. We expect leaders to demonstrate commitment by their actions, committing necessary resources, removing barriers, ensuring risks are identified and managed, and leading efforts to continuously improving (Hannan 2012),
11. Often the focus is off-the-job safety topics (Liveris 2012), and
12. Active employee participation in programs like CPP, as well as local safety committees, helps instill a culture of safety at all levels (Bell 2012).

The last section of data collected was the organizations that currently participate in national and international voluntary protection programs. OSHA's database of facilities that participate in OSHA's Voluntary Protection Program (VPP) identified the following organizations, from the list of 45 "CEOs Who Get It." From Appendix B, the table below lists the organization that currently participates in VPP, and the number of sites/ facilities.

	Organization	VPP	# VPP
2013	CDM Smith	YES	1
	Covanta Energy Corp.	YES	41

	Organization	VPP	# VPP
2011	CH2M HILL	YES	1
	Parsons Corp.	YES	13

2012	Fluor Corp.	YES	2	2010	U.S. Air Force	YES	4
	U.S. Marine Corps	YES	1		U.S. Army	YES	9
	Dow Chemical	YES	14		Rockwell Auto.	YES	2
	Veolia Technical	YES	12		DynMcDermott Petro	YES	4
	Louisiana-Pacific	YES	4		Raytheon Co.	YES	25
	Gribbins Insulation	YES	1		The Boeing Co.	YES	2
	Air National Guard	YES	2		Fiberteq LLC	YES	1
	CH2M HILL	YES	1		URS Corp.	YES	8
2011	Parsons Corp.	YES	13	2009	Weyerhaeuser Co.	YES	10
	U.S. Air Force	YES	4		PPL Corp.	YES	8
	U.S. Army	YES	9		U.S. Navy	YES	17

Of the twenty six organizations that participate in OSHA VPP, only five leaders mentioned participation in OSHA voluntary protection programs, alliances, or partnerships during their NSC interview. These leaders that mentioned and/ or recognized OSHA VPP, alliances, or partnerships are:

1. James H. Miller, Chairman, President & CEO, PPL (Miller 2009)
2. Robert E. McGough, President & CEO, DynMcDermott Petroleum Operations Co. (McGough 2010)
3. William H. Swanson, Chairman & CEO, Raytheon Co. (Swanson 2010)
4. Lieutenant General, Harry M. Wyatt III, Director, Air National Guard, National Guard Bureau (Wyatt III 2012)
5. Jim Bell, President & CEO, Veolia ES Technical Solutions LLC (Bell 2012)

An analysis of all interviews for mention of international protection programs was provided by one interviewee, Jim McNerney, Chairman, President & CEO, The Boeing Co. (McNerney 2010). McNerney states:

> We're working to overcome challenges in three important ways. First, we're establishing a common safety management system at all of our major manufacturing facilities across the globe that will conform to the OHSAS 18001 standard. The benefits of this approach to employees and the company are clear: one safety language, a consistent way to identify risk and shared expectations. Second, we're embedding ergonomics and workplace-safety principles in the design of manufacturing processes, and we're making targeted investments where needed. And third, we're involving employees and leaders alike by providing tools and resources to help drive improvements. Then we're challenging ourselves to share successes and learn from achievements around the company to prevent injuries (McNerney 2010).

Lastly, only two of the leaders Lockhead 2009 and Liveris 2012 were asked "What advice do you have for other CEOs who want to "get it"?

Moir Lockhead responded with:

> Above all, be relentless in your efforts to create an active, caring safety culture. Provide the workforce with opportunities to participate in safety, and increase the frequency and quality of safety conversations between management and front-line employees. To help promote hazard recognition, risk assessments must be built into the safety process, empowering employees to take action to prevent injuries. Hold line managers

> accountable for leading injury prevention and "owning" safety for their area of operations (Lockhead 2009).

Andrew Liveris responded with:

> I would advise them to set bold goals – goals so aspirational that you do not know how you can possibly achieve them. Only then will you truly stretch yourself and your people. …I also would tell them to set the tone from the top. Leadership, from the board of directors down, plays a key role in cultural change. Safety must involve everyone. Make safety a core value rather than an initiative, infuse it into your corporate strategy, integrate it across your company, and continually measure progress. In addition, leaders should take every opportunity to talk about safety. They must show they personally care….. Finally, never be satisfied. The moment you become satisfied with performance, you become complacent. The constant drive to zero, to perfection, is the key to "getting it." (Liveris 2012)

5.3.b Key Findings from CEO Statements

Key findings from the CEO statements, to identify the roles and responsibilities of an EHS Manager that best supports an organization achieving environmental stewardship and workplace safety, include:

1. When asked "why is safety a core value at your company," many leaders had similar responses grouped into the following four categories: (1) EHS as an equal aspect of the

organization, a top priority, and/ or a part of the culture, (2) positive financial contributor, (3) employee as a valuable asset, and (4) moral and ethical commitment.

2. When asked “what is the biggest obstacle to safety in your workplace,” similar responses are grouped into the following five categories: (1) complacency, autopilot, (2) hazard recognition and control, (3) funding, (4) safety knowledge/ education, (5) other. Complacency or autopilot was identified as the most frequent response from 12 of the interviewees.

3. When the leaders provided how they overcame their biggest obstacle, there was great variety and depth in the responses.

4. Leaders provided a lack of leading indicators when asked “how do you measure safety? What are the leading indicators that show you how safe you are, and where do you see room for improvement?” Many lagging indicators were provided as a response to this question.

5. Leaders provided varying responses, with several possible roles and responsibilities of an EHS manager, to “how do you instill a sense of safety in your employees on an ongoing basis?”

6. Of the forty-five interviewees, twenty-six organizations were found to participate in OSHA Voluntary Protection Programs. Of the twenty-six organizations, only five mentioned participation in OSHA VPP, alliances, or partnerships. Of all interviewees, one credited participation in international voluntary protection programs.

CHAPTER 6 - ANALYSIS

Roles and responsibilities that were supported by literature review, conferences and expositions, and by leader interviewees include:

1. Top management must commit to EHS excellence
2. Establish leading indicators
3. Understand the organization's culture and climate towards EHS
4. Monetize EHS initiatives and management
5. Identify top management vision, and employee obstacles
6. Establish and participate in EHS programs that go beyond regulatory compliance.
7. Provide effective leadership, and promote EHS leadership by each employee.
8. Implement and actively manage an EHS management system.
9. Evaluate and consider national and international voluntary protection programs.
10. Prepare to evolve as an EHS manager to provide value to the organization and employees.

Disparity was recognized with participation in national and international voluntary protection programs, and with economic analysis.

A significant number of leaders participated in, or recognized, voluntary protection programs in this thesis study, but as compared to the total number of organizations in

the United States, and throughout the world, this is an extremely select group of organizations that are recognized for meeting voluntary programs standards.

Disparity with economic analysis was strong with unknowns that must be factored into the analysis, and the motivating strength economic analysis provides top management throughout organizations. Many leaders explained that personal responsibility to EHS was a stronger motivator than the "bottom line," and many leaders explained that money is the bottom line of business.

Chapter 7.0 Results and Conclusions

Establishing an organization's commitment towards environmental stewardship and workplace safety [as elements of social responsibility], requires the EHS Manager not only to ensure compliance with laws and regulations, but to provide effective leadership with voluntary EHS management systems and programs. In addition to the EHS Manager championing EHS within an organization, the EHS Manager, must be knowledgeable in many disciplines, speak the language of the organization, and excel in non-traditional responsibilities.

As presented in the introduction of this research, and throughout, the commitment to implement and establish EHS management, voluntary and best practices, is provided by top line management. Accountability and control of EHS within an organization resides with top line management, and therefore commitment to EHS is provided from the highest management/ executive level.

Top line management providing organizational commitment, to EHS compliance, and voluntary systems and programs, will vary significantly throughout the variety of industries and organizations existing. Compliance is the minimum requirement to operate, and the latter (voluntary systems and programs) requires a choice, a commitment, a vision towards social responsibility, and excellence. The depth of this voluntary commitment to EHS is based on the organization's top manager/ executive, and the organization's mission and vision.

Stakeholders, internal and external to the organization, will continually strengthen EHS responsibilities and excellence in EHS. A mission to zero deficiencies, injuries, and environmental impact will continually grow with importance.

EHS is being recognized as an equal part of the organization, and as important as operations, maintenance, and other core functions. Voluntary systems and programs are a necessity, and minimum expectations increase, as education and awareness with EHS strengthens in the community.

The results of this thesis provide guidelines for the roles and responsibilities of the EHS manager in establishing an organization's commitment towards environmental stewardship and workplace safety [as elements of social responsibility). The roles and responsibilities, as identified through triangulation (comparing interviewee's responses to literature reviews and conference participation), provide the following ten items. These ten items are ranked based on highest strength and support, as identified by literature reviews, conference participation, and interview analysis, and as apparent strength and support by the researcher. One is identified as highly ranked and supported, and ten is least ranked and supported by the findings of this research:

1. Ensure top line management provides commitment to EHS management that is aligned with the organization's mission and vision of EHS excellence. Verify this commitment by the level of employee involvement and engagement. Additionally, the EHS function should have a representative at a top management/ executive position.
2. Implement and actively manage an EHS management system, include EHS programs that go beyond regulatory compliance. Develop and/ or refine mission, vision, directives, procedures/ policies, and work instructions to ensure regulatory compliance, best practices, and voluntary commitments.

3. Provide active and effective leadership as an EHS Manager, and promote EHS leadership by each employee. Ensure employee responsibilities with EHS are clearly identified, communicated, and employees are held accountable.

4. Continually assess and improve EHS culture and climate. Identify factors that motivate top line management, and employees, to strive towards EHS excellence, and identify obstacles and challenges for those managers and employees. Top line management may need to rethink and communicate core values, and their personal concern for their communities and employees EHS (understanding and improving behaviors and attitudes toward EHS is within the organizations culture and climate).

5. Evaluate participation in national and international voluntary protection programs, such as OSHA VPP, ISO and BSI. Review successful case studies, value, and benefits to the organization with top line management.

6. Monetize the value of EHS initiatives and management systems to the organization, and evaluate total cost. Communicate EHS in terms of the organization's vocabulary. Recognize non-EHS benefits to an organization when improving EHS.

7. Establish and measure leading indicators, with an emphasis on leading.

8. Ensure continuous improvement in all aspects of EHS management.

9. Evolve as an EHS manager to gain awareness, knowledge, and stay current with EHS. Attend conferences, review literature, and interact with EHS professionals. Continually focus on evolving as a manager and leader within the organization, and with the employees.

10. Review “green” options and alternatives, to strive towards zero impacts to society. Evaluate energy efficiency within the organization, for example with building’s resource use of electricity, water, and waste disposal.

Appendix A – Timeline of New York Times Articles & PBS Video Specials

Jan 08, 2003	At a Texas Foundry, An Indifference to Life
Jan 09, 2003	A Family's Fortune, a Legacy of Blood and Tears
Jan 10, 2003	Deaths on the Job, Slaps on the Wrist
Jan 11, 2003	Death in the Workplace
Jan 12, 2003	Life, and Death, at a Foundry
Jan 16, 2003	2 at Hazardous Foundry Tell of Events Costing One His Legs
Feb 5, 2003	A Dangerous Business | FRONTLINE | PBS - http://www.pbs.org/wgbh/pages/frontline/shows/workplace/view/
Mar 14, 2003	Cracking Down on Rogue Employers
May 15, 2003	Criminal Inquiry Under Way At Large Pipe Manufacturer
Dec 16, 2003	Officials at Foundry Face Health and Safety Charges
Feb 21, 2004	Worker Is Crushed to Death At Troubled Foundry Upstate
Mar 19, 2004	Times and PBS Win a Reporting Prize
May 27, 2004	Plea Agreement Is Reached in Pipe Case
Mar 23, 2005	Foundry Pleads Guilty to Environmental Crimes
May 02, 2005	With Little Fanfare, a New Effort to Prosecute Employers That Flout Safety Laws
Apr 27, 2006	Guilty Verdicts in New Jersey Worker-Safety Trial
Feb 5, 2008	A Dangerous Business Revisited | FRONTLINE | PBS - http://www.pbs.org/wgbh/pages/frontline/mcwane/
Apr 25, 2009	Iron Pipe Maker Is Fined $8 Million for Violations
Dec 20, 2012	OSHA Investigating Worker Death at McWane Foundry

Appendix B – VPP Participation and Frequency in Responses

	Organization in Year Honored	VPP	# VPP	W1	W2	W3	W4	W5	O1	O2	O3	O4	O5
2013	Federal Aviation Admin.					X					X		
	CDM Smith	YES	1	X						X			
	Covanta Energy Corp.	YES	41	X						X			
	WA Transit Authority					X			X				
	Fluor Corp.	YES	2		X							X	
	Butler Rural Electric					X					X		X
	U.S. Marine Corps	YES	1			X					X		
	Petrochem Insulation					X							X
	Dow Chemical	YES	14										
	Tetra Tech Inc.					X						X	
	Veolia Technical	YES	12	X		X							
2012	Louisiana-Pacific	YES	4			X			X				X
	Gribbins Insulation	YES	1	X									
	Georgia-Pacific				X								
	Brady Corp.			X									
	Diverse Power Inc.					X			X				
	Air National Guard	YES	2							X			
	Bahrain National Gas			X		X							
	CH2M HILL	YES	1					X	X				
	Parsons Corp.	YES	13	X	X				X				
	KIK Custom Products												
2011	GEA Power Cooling			X					X				
	U.S. Air Force	YES	4	X					X				
	Hess Corp.			X					X				
	U.S. Army	YES	9										
	MACTEC Inc.					X	X						
	Day & Zimmermann					X							
	AMEC's Division					X							
	Rockwell Auto.	YES	2		X								
	DynMcDermott Petro	YES	4		X		X			X			
2010	Raytheon Co.	YES	25					X					
	The Boeing Co.	YES	2		X	X							
	Vetter Stone Co.					X			X				
	Fiberteq LLC	YES	1			X			X				
	URS Corp.	YES	8		X	X							
2009	FirstGroup PLC					X				X			
	Concorde Limo.					X							

SC Vocational Dept.				X				X				
Weyerhaeuser Co.	YES	10				X			X			
PPL Corp.	YES	8	X					X				
CCI Mechanical						X					X	
RQ Construction				X	X							
E.On U.S.			X	X								
U.S. Navy	YES	17	X									
NES Rentals					X							
Luwa Inc.				X	X							

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